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for

Physicians and Surgeons in Industry

Volume 3 MARCH, 1934 Number 3

THIS ISSUE

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Published Monthly by Industrial Medicine, Inc.

Publication Office, 413 Pleasant St., Beloit, Wis.

Editorial and Executive Offices, 844 Rush St., Chicago.

Industrial Medicine

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This magazine is published to promote sound thought upon and concerning industrial medicine. To that end it will contain articles, news items, reports, digests and other presentations, together with editors' comments. The editorial policy is to encourage frank discussion. On this basis contributions are invited. The editors will exercise care in checking on the accuracy of data printed, but in all other respects articles and opinions of which expression is allowed are the articles and opinions of their authors —the editors reserving in all cases the right to comment on the same, in the current or any subsequent issues, as they may be inclined.

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And, lastly, utter loss of hope itself
And things to hope for! Not with these began
Our song, and not with these our song must end."
—WORDSWORTH.

The Law, the Science and the Economics of Industrial Health

Volume 3 **MARCH, 1934** **Number 3**

Occupational Diseases

—*The Function of the Insurance Company in Their Prevention and Control*—

by

A. D. LAZENBY, M.D., F.A.C.S.*
Chief Surgeon
Maryland Casualty Company
Baltimore, Maryland

OCCUPATION *per se* should never be a menace to man's physical well-being. To the contrary, regular occupation, with the earning power and the happiness and the accomplishment that it engenders, is perhaps man's greatest assurance of physical and mental health. A man at regular occupation is no more subjected, under our congested mode of life, to epidemic disease or to other ordinary physical or mental disturbance than is a man unemployed.

Our modern industrial life has, however, introduced to us certain substances and processes that are intolerable to the human organism. If the worker is to operate in contact with these inimical agents, he must be protected from their harmful influences, and must learn, as well, to protect himself.

Industrial hazards, and the danger of certain occupational exposures are not new, however. Lead intoxication was described by Dioscorides in the first or second century after Christ. He described not only the colic but also the paralysis attendant upon this condition. Pliny was familiar with the hazards attendant upon lead processes, and suggested methods of prevention.

As the years have advanced, as the science of chemistry has progressed, as human needs have multiplied, as industrial processes have developed to meet those needs, so has the use of dangerous substances and processes, and so have the number of workers exposed increased. The problem of occupational disease is one of the foremost within the range of our present industrial vision.

It is not a problem primarily of compensating the victim of inimical occupational exposure, although compensation seems to have succeeded thus far in dominating the immediate picture. We cannot compensate vigorous health into the leaded, nor good lungs into the silicotic. Our pressing problem is the prevention of the disease. The necessity for treatment, vital though it is, is the badge of, and compensation the penalty for, failure.

As man, in ages past, has demonstrated his adaptability to the forces surrounding him, so can he, so must he, and so will he meet this immediate menace.

THERE is no more vital problem confronting the industrial employer today than the conservation of the health of his working force. This thought is not to be associated alone with the specific hazards of manufacturing methods, but relates even more definitely to the physical efficiency of his employees, their workmanship and

---

* From a lecture under the auspices of New York Tuberculosis and Health Association, The Committee on Public Health Relations of the New York Academy of Medicine, in cooperation with the New York State Departments of Health and of Labor, New York City Department of Health, National Bureau of Casualty and Surety Underwriters and American Society of Mechanical Engineers, March 15, 1934.

attendance. Absenteeism, labor turnover, work spoilage, and diminished output are all factors which bear heavily upon production costs. They bear much more heavily than the average employer can be made to believe, because their influence cannot be made to appear as a red item in the ledger.

As a reasonable man, however, how can the average employer fail to appreciate the cost of work spoilage, impaired output, inaccuracy, and of accidental injury resulting from the efforts of the worker with tortured eyesight? How can the owner of a fleet of trucks fail to comprehend that the cost of accident caused by his one-eyed chauffeur must come directly out of his profits? How can the salesman with an abnormal blood pressure, and a chronic headache, properly extol the merits of the article he is merchandising? Can one properly criticize the salesgirl who is discourteous to her customer when she is in a state of physical exhaustion through the poor ventilation and illumination of her working environment?

Industry, as the years advance, is coming more and more to regard as significant those flesh-made machines we call men. Workmen's compensation legislation, which brought home in a financial way the realization that human wreckage was quite as much a matter of production cost as machine wreckage, has done much to foster the interest which is now becoming more and more manifest toward the worker. Self-interest must motivate industry in its constant progress toward a tangible manifestation of its concern for the physical well-being of its employees. This is as it should be. The American does not seek paternalism, nor does he want something for nothing. There is, moreover, no more compelling drive than the need to help oneself, whether one be an individual or an industry.

In considering the relationship existing between industry and the health of its workers, one must realize the community of interest that exists. Neither capital nor labor stand to lose anything, but each to gain greatly by cooperative efforts leading to health conservation activities, proper ventilation, illumination, and the creation of a proper and healthful working environment.

And now, with the threat presented by the increasing recognition of occupational disease, and the fertile field for illegitimate claim practice that accompanies it, the employer must be on the *qui vive*. Eventually he is going to be called upon to pay, in one form or another, for the ravages of the diseases of occupation, and the bill is likely to be staggering. Certain it is, the employer must look well to the health of his employees, to the suitability of their working environment, to adjustments in his manufacturing processes, perhaps to his advantage, if he wishes to avoid the devastating cost of the specific diseases that his factory may produce. Thus may he minimize his financial losses, and at the same time gain those intangible benefits accruing through health conservation that he cannot see in his annual financial statement.

The earliest reference that I can find to the history of the safety movement is made in the Old Testament. "When thou buildest a new house then thou shalt make a battlement for thy roof, that thou bring not blood upon thy house if any man fall therefrom." (Deuteronomy 22: 8). Since that day, the accident prevention program has steadily advanced, until now he is a stupid man indeed who does not recognize its benefits and laud its results.

The advent of workmen's compensation legislation, and the steadily mounting toll of industrial accidents, introduced to the employer of labor another cost factor. Insurance rates have increased almost to the saturation point. Insurance carriers annually spend much more than they collect in the payment of claims arising out of their workmen's compensation business. It seems logical, therefore, to turn our eyes to the still untilled fields of accident prevention in the industrial world. Humanity alone should prove an ample challenge, but after all the pocketbook is a more vigorous urge. Let us say then that the eyes of humanity, aided by the spectacles of possible financial loss will give us a glimpse of a new day in accident prevention work.

It would be a waste of time and a presumption for me to attempt to discuss the question of the prevalence of occupational disease or its economic or humane significance. All are familiar with the conspicuous place which silicosis has taken, not merely as the basis for numerous unjustifiable claims against industry, but also as a real and living actuality in the fields of industrial life and public health. The cumulative effects of silica dioxide and some silicates upon the human body greatly obscure a problem already great in its magnitude.

While successfully preventing the development of silicosis is not an easy task, it is one that, with study and effort, can be accomplished. At the moment we are in a position where a staggering situation has crept upon us from behind, as it were. Our major problem with reference to silicosis at the present moment is, as I comprehend

it, not wholly the prevention of future disease, for forewarned is forearmed, but in properly disposing of those cases that have developed in the past many years, and in taking care of those who have been exposed, but are as yet physically productive. Workers in the latter group must be so cared for that their known susceptibility to further exposure to dust be not imposed upon. This, however, is rather beyond the scope of this discussion.

CAREY McCORD tells us that there are 700 substances used in industry which have been directly or indirectly associated with skin diseases. Forty or more diseases of the skin have been definitely found to have industrial origins. Various dermatologists state that 10% of all of the skin diseases which they are called upon to treat are definitely occupational dermatoses.

Coupled with this widespread industrial hazard, and greatly complicating it, is the condition spoken of as allergy. One man may not react unfavorably to a given toxic agent, whereas his immediate neighbor may be totally incapacitated by it. Thus arises a situation that taxes the ingenuity of the physician and the safety engineer, and offers a fertile field for the activities of lawyers of a certain type.

I discuss the foregoing, not in an attempt to delineate the extent to which occupation diseases threaten us, but merely to indicate very roughly some outstanding but typical problems which must be solved.

Future steps in accident prevention must carry us beyond the field of mechanical safeguard, safety posters and propaganda, as valuable as these have proved to be, into such realms as illumination, ventilation, air condition, and by no means the least, physical conditioning of industrial workers. A sick man, or for that matter, a well man, forced to work in an environment not adapted to his physical functionings, cannot be a safe man, an efficient employee, nor an asset to industry.

In asking me to discuss the function of the insurance company in the prevention and control of occupational disease, your committee has thrust upon me a task for which I am ill-fitted. Though the medical department of the insurance company has a perfectly clear cut role to play, the greatest part of the task must necessarily fall upon the engineering and accident prevention department.

Before this latter department can perform its function efficiently, however, it must know what it must prevent, and it must have a group of workers, physically qualified for their duties, upon whom to expend its energy. It falls to the lot of the industrial physician to tell the engineer what substances are harmful, and how they exert their harmful influences. It is not enough for the engineer to know that exposure to lead dust produces certain characteristic symptoms. He must know how the lead enters the body, what happens to it after it gets into the body, how it leaves the body. He must be informed of the pathological manifestations of the noxious agent after it has been absorbed, and often finds it valuable to have information describing the chemical changes that take place in the human organism. For assistance such as this, the engineer must look to the medical department.

Nor is it enough for the enginer to understand that exposure to dust often produces disabling disease. He must know that the chemical and pathological characteristics of various dusts govern their toxicity and their behavior in the lungs of the worker. If he knows that dusts composed of silica dioxide and certain silicates produce unfortunate results, and that the dusts of the limestone quarry do not, he has something upon which to pin his future course of action. When the industrial physician informs him that not only is the chemistry of the dust significant, but also that its concentration and particulate size are matters of paramount importance, he is better guided in his future efforts to devise adequate ventilation systems, and to select proper air filtering mechanisms.

For the moment, the physician's duties stop. Knowing which substances are harmful and which are not, and the avenues through which the harmful ones exert their influences, the engineer now brings into operation his technical knowledge, and designs facilities whereby toxic materials are kept in an atmosphere separate from that utilized by the worker. He places his exhaust ventilation strategically, removes dust but does not redistribute it, substitutes wet processes for dry ones when other methods cannot be used, and does whatever he must to keep the workman and the poison from harmful proximity with each other.

In these practical and technical activities the safety engineer works without the help of the medical department. His principal ally must be the employer. The latter must be willing to cooperate in installing the necessary equipment, in selecting the proper workers, and checking the health of his workers periodically. He must ex-

pend money to create a safe and proper working environment. This investment may be high, but its dividends will far outweigh its initial cost. Not only will the employer save the expense of claims for occupational disease, but his dividend will appear also in the improved morale and efficiency, and through a reduction in his accident frequency through better health in his working force.

AFTER all this is done, the industrial physician again comes into the picture, in those industries where occupational hazards exist. He must maintain constant check upon the efficiency of the safeguarding equipment by frequent study of the atmosphere, plant sanitation and the personal hygiene of the workers. Physical examination of exposed employees must be conducted at regular intervals along suitable lines. The workman exposed to lead must, in addition to regular physical examination, have frequent blood and urine studies made, and the man exposed to harmful dust must have regular x-ray pictures of his chest taken, so that at the first indication of the disease, his exposure may be halted, and suitable and safer work found for him. Likewise, workers in other trades, exposed to occupational hazards, must be constantly kept under trained medical observation, as a check upon the efficiency of the mechanical safeguard, and upon the worker's personal susceptibilities.

The growing awareness of the seriousness of occupational disease, the involved and highly specialized fields of industrial medicine, plant sanitation, ventilation, illumination, fatigue, etc., present a challenge to the medical profession. The average physician is not prepared to recognize, nor often to treat many of the occupational diseases. His lack of time and lack of opportunity have prevented him from making the deep personal study of manufacturing methods and men necessary to create within him the realization that inside the factory walls lies perhaps one of his greatest fields for activity. His aversion to the so-called "company doctor" as he has been contemptously pleased to term the physician in industry, has led him to ignore the significance of many of the problems of industry that lie directly within the proper scope of medicine.

These circumstances have led to indifference, both in medical teaching and practice. As a result, industry cries for help, and medicine is not equipped to give it. Medicine has overlooked its most fertile field for health conservation. It has let a great opportunity slip by. It has done more; it has discountenanced and discouraged the activities and constructive work of the pioneers in the field of industrial medicine, and has retarded progress in this field for many years.

Despite this fact, industry needs medical aid, not only in caring for its accidents and in meeting the threat of its occupational disease, but as well in all of its activities involving personnel.

Thus appears the definite professional specialty —industrial medicine and surgery.

The medical profession must recognize this speciality and all that it implies with full respect. It must go even farther by fostering it and teaching its problems to the younger generation of physicians, if it is to live up to its highest traditions.

CONTRARY to popular beliefs, occupational diseases are not rare. Every general practitioner comes into substantial contact with them, although unfortunately he does not always recognize them. Illustrative of this, I have learned, at the present time, of the case of a hatter who is suffering from chronic mercurial poisoning. For two years past this man has been under treatment for paralysis agitans, and indeed, has been shown to classes of medical students as a case illustrating the latter condition.

We do not, in fact, know just how extensive a place diseases of specific occupation take in our modern medical and industrial lives. In only 11 states are such disease reportable by law. Even in these states the data collected are far from conclusive, since without doubt many more cases of occupational disease are not recognized and reported than are.

We can be sure of one thing, however. In any effort to prevent, control or treat occupational disease, the physician trained in such matters must play a most conspicuous part. In some instances the belief seems to exist that the engineer alone is able to fulfil the task. This is not true; the physician must take a definite, and in some cases even a dominating part in any activity designed for the physical conservation of the worker.

Moreover, the physician must be highly trained in his specialty. His knowledge must extend beyond the mere scope of his profession. It must include mechanical processes, toxiology and psychology. Industry needs him and medicine must supply him. The private practitioner has neither the time, the opportunity, nor often the aptitude to give to the problems of industry the thorough and painstaking study necessary to qualify him

to fit efficiently into the picture. Medicine can supply this need, and by intelligent attention can do so without in any way jeopardizing its economic status.

Before any real progress can be made in a program leading to the prevention of occupational disease, strong legislation is necessary in the several states. I refer not to laws regarding the broadening of the workmen's compensation act, but specifically to laws setting up standards for use where noxious substances are involved in industry, governing safe practices in the handling of such substances, and regulating the responsibility of the employer for the physical well-being of his employees perilously exposed.

Not only is this legislation necessary, but also the proper machinery for enforcement. So many laws go by default because of neglect or indifference in the execution of their mandates. Here is a situation where human life may be in peril, and laxness is intolerable.

How can great achievement be made in the prevention of this great social peril without proper research facilities for checking progress, uncovering unsuspected hazards, and devising means of neutralization or prevention. Without doubt many toxic substances now in common use could be replaced by innocuous materials, without hampering efficiency, if we only knew the toxic substances and could only discover the substitutes.

There is a great need now, and as time goes on, the need is going to grow, for industrial laboratory facilities to study various atmospheres, fumes, chemicals, minerals and dust, especially with reference to their behavior upon the human body.

If we but know the danger and how it manifests itself, human ingenuity, which has stood us in good stead throughout the ages, will not fail to discover a way out.

I am not overlooking for a moment the wealth of research work which has been done on this subject in the past by some of our outstanding scientists. Their works are veritable monuments in the field of social welfare. Such researches fill a great gap, but cannot possibly, owing to very obvious limitations, take the place of research directed at a specific problem, or a potential problem in a specific plant, involving a specific process.

The employer of labor must not underestimate the danger to which he is exposed in the present trend toward the liberalization of existing workmen's compensation laws to include occupational disease. Already the existence of several industrial concerns is threatened by litigation arising out of silicosis. The amount of money involved runs into millions of dollars, and the surface has not been scratched. In addition to the possibility of legitimate claims, the rackets have already invaded the occupational disease field, and unscrupulous lawyers aided by unscrupulous or uninformed doctors are fabricating claims on a wholesale basis. The employer is going to be obliged to pay this bill, and bills in addition for many diseases not heretofore recognized as having industrial origins, but which later, as interest and research develop, may prove to be so associated in their inceptions.

THE EMPLOYER must either be willing to pay this cost, or he must do something to prevent it. One of the chief obstacles which the safety engineer of the casualty company meets in the industrial plant is the resistance of the management to changes in methods or safeguards to prevent accidents. If this resistance is as stubborn in the field of occupational disease prevention as it has proved to be in accident prevention, the employer will find his costs for insurance prohibitive, or he may even find himself uninsurable.

The employer would do well to familiarize himself with any legislation proposed to include within the workmen's compensation act provisions embracing occupational disease. Such laws, unless rigidly drawn, can open up avenues that will produce tremendous and unjustified drains upon industry, as it is at present conducted. Admitting the justice of the philosophy that human wear and tear is as proper a charge against industry as the wear and tear of machines, we know well that the administration of some of our workmen's compensation acts has been so broad and liberal that industry has been taxed far beyond the spirit of the law, or far beyond the requirements of social justice.

Occupational disease legislation, unless carefully drawn, is even more susceptible to broad interpretation than workmen's compensation laws. It can easily be adapted to embrace in effect compulsory health insurance, old age pensions, and unemployment insurance for workers. There is no shortage of advocates of the theory that occupation can be considered the basis for almost any disease to which mankind is heir, nor is there any dearth of theorists who believe that capital should bear all of the burdens of labor, and are eager for the opportunity which occupational

disease seems to offer to put their theories into practice.

I have endeavored to sketch over, rather briefly, a few thoughts, hoping that you might be able to see, with me, the great humane, social and financial problem that occupational disease presents to us as employers, workers and citizens. I have tried to point out that the solution of the problem lies solely and only in the prevention of disease, and we cannot pass a law that will do that.

The prevention of occupational disease is a broader subject than appears upon the surface. It involves scientific research, trained medical attention, both preventive and therapeutic, the skill of engineering and technical experts with specialized knowledge, and by no means the least, the intelligent and helpful cooperation of the employer and his men. The tremendous progress of the safety movement has come about through the selling of every employer and every workman the idea that the safe way is the best way.

The same practice must be followed if the promotion of industrial health is to be anything more than a hope.

IN GENERAL the self-insured employer is a large employer. His financial reserves are large, and his business is conducted on a broad scale. In most instances he has at his immediate call the services of the industrial physician, the safety engineer, and the opportunity for seeing, in its broadest aspect, the need for their highly specialized services. His financial strength is usually adequate for him to have such experts upon his staff. The construction of his plant has usually been adapted properly to handle any materials that are used in his business. If he has not already learned of the serious possibilities that industrial poisons offer, he will learn just as soon as he starts to pay for the results, which are an inevitable sequel. He will then, if he has not already done so, take what steps are necessary to prevent repetition. He may decide that self insurance is too costly, and turn to a private insurance carrier. If so, he may be assured that any necessary improvement in his prevention facilities must be accomplished before his risk can be accepted.

The insurance company exercises its function, quite obviously, upon those manufacturers who insure their risks privately. Such concerns are, as a general thing, not of sufficient size to warrant the employment of an expert staff to aid them in their efforts to prevent disease. The number of the employees in their individual plants, and the size of their operations, do not justify the large expenditure that such experts would require. They, moreover, do not pay directly the costs that develop from their accidents and industrial diseases. Frequently their actual expenditures in insurance premiums are substantially less than the losses on their risk through accident or disease. They profit to this extent through the application of the principle of insurance, whereby the fortunate helps to carry the burden of the unfortunate. Of course, in time their premiums will reflect their adverse experience, but nevertheless the employer is not brought face to face with the stark reality of the loss of great sums of money. He thus fails to appreciate the application of the problem to his particular situation. This quite naturally does not help the end result. His employee continues to suffer, and the cost must be paid from one source or another.

Quite frequently the manufacturing equipment, the ventilation system, the plant sanitation of these smaller risks are not adequate to cope with the poisonous substances used. The employer may not be aware of the dangerous conditions under which his men work, nor indeed may he be interested.

It is here that the insurance company exercises its function. For many years, insurance companies have realized the real worth of a program of conservation, and as their losses in their business become prohibitive, the vital importance of a program of conservation is brought home to them with increasing vividness. This realization by the insurance company, and its cooperative personal contact with those industrial concerns who insure with it, means that its facilities and its efforts are going to be brought to bear upon a channel of industry that perhaps cannot be reached through any other source. Whereas the individual manufacturing plant cannot afford to employ the technical experts that it needs in its accident and disease prevention activities, the insurance company, through the large number of such risks that come under its purview, is able to make available the much needed expert services. The private insurance carrier, thus aided by the strong legislation and safety codes, and by the active cooperation of the employer, which it is hoped may be forthcoming, can, through its efforts, bring to 95% of the workers of this country the opportunity to carry on their daily trades in safety, health and productivity.

Modern Industrial Medicine

—Being Chapter III of the Story of the Evolution of This Science from Origins in Antiquity—

by

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THE IMPETUS to learning, discovery and invention that the Renaissance gave the 17th Century, continued by leaps and bounds, and culminated in the invention of the steam engine in the latter part of the 18th Century. The application of steam power saw the birth of modern industrialism. It created the modern factory, expanded transportation facilities, produced urban life with all its difficulties, introduced child labor, developed public health and factory legislation. As an outcome occupational hygiene and industrial medicine became an entity in the field of preventive and curative medicine.

Ramazzini's book, "Diseases of Tradesmen," was translated into English in 1705, into German in 1735 and into French in 1777, altogether 20 editions and translations. The expansion of industry was rapidly developing and this book had a marked effect on the medical profession generally, as a guide to observing the signs and symptoms of disease among workers and toilers.

"What trade does he pursue?" is the immortal question that Ramazzini offered in his advice to physicians on first seeing a patient and this question is of the utmost importance today. This astute clinician called attention to the prevalence of consumption in dusty trades, among miners, potters and steel workers. The prevalence of this malady inspired Thomas Benson, of Newcastle, England, in 1713, to secure a patent for a wet process in grinding flints—an early attempt at dusty trade preventive work.

In 1712, E. Kaemfer described a dermatitis from lacquer varnish, placing dermatology in the occupational disease group.

Investigators continued to add to the knowledge of the toxic effects of lead, the metal that from Hippocrates' time down through the ages has caused more morbidity than any other occupational factor.

John Huxham (1692-1768) of Totnes, Devon, in 1724, described the Devonshire colic very vividly:—"the vomiting, the hard-like abdomen which did not respond to the most drastic purges and clysters, griping pains, paralysis of hands, convulsions and delirium." (Published in "Observations on Air and Epidemic Diseases," 1759.) Huxham was one of Boerhaave's pupils, who in 1739 observed Devonshire colic among cider drinkers without determining that the true cause was due to lead.

It remained for Sir George Baker (1722-1809) another Devonshire physician to determine, in 1767, that the sheet lead in the cider vats and presses was the real cause of the poisoning that produced Devonshire colic. He was able to recover lead from the cider. His paper on this investigation won him his baronetcy.

Theodore Trochin, a native of Genoa and another of Boerhaave's pupils, later professor of medicine at Geneva, noted in his book, "De Colica Pictonum," (1757) that among potters, where lead was used as a glaze, nausea, vomiting, griping colicky pain in the region of the umbilicus and palsy of the hands were experienced. He also reported some cases of colic following the drinking of wine which had been sweetened by lead, and the drinking of water poisoned from passing through gutters from lead covered roofs.

Thomas Cadwalder (1708-1779) an American, made some important studies on the West Indian gripes (lead poisoning), caused by distilling rum through leaden pipes, which were published by Benjamin Franklin at Philadelphia in 1745.

John Fothergill, 1712-1780, a pupil of the first Munro, a successful London physician, among his collection of medical papers, made observations on disorders of painters of water colors, which deal with lead poisoning, ("Colica Pictonum").

In 1780 Guyton de Morveau also stressed the danger of industrial lead poisoning. In the same year Philbert Chabot published a memoir on animal anthrax.

The great Amsterdam physician, Herman Boerhaave, is credited with making probably the first animal experimentation with carbon monoxide gas in 1732, about the time he wrote his famous text book "Elementa Chemise." This observer had already, in 1709, described heat

stroke as "isolation," a condition common today among foundry and asphalt workers.

While scurvy is a deficiency disease, from the time of Hippocrates down it has been considered a seaman's malady. This scourge which regularly killed entire crews became lessened and controlled through the observation of an Edinburgh naval physician, Sir James Lind, 1716-1794, who published his first book on scurvy in 1753. To him must be given the credit for the prevention of this disease by dietary methods, using animal and vegetable foods in combination with oranges and lemons. His work in naval hygiene and tropical medicine won for him the title of the "Father of Nautical Medicine." Blane standardized the rationing of lemon juice against scurvy in the Royal Navy of England.

Sager in 1765 called attention to the fact that the foot and mouth disease in cattle was transmitted to man.

Dessault in 1766 introduced his famous bandage for fractures.

Percival Potts (1714-1788) that famous London surgeon whose name is associated with the fracture of the fibula and spinal caries, wrote in 1775 a masterpiece on chimney sweeps' cancer. He asserted that this form of scrotal cancer was due to some tumor-exciting substance in the soot.

The Chimney Sweepers Act of 1788 was motivated by Potts' account of chimney-sweeps' (scrotal) cancer (1775) which set forth the misery and virtual slavery of the poor "climbing boys," and was followed by Jonas Hanweys "Sentimental History of Chimney Sweepers," 1785. Yet, in spite of Lord Ashley's Acts of 1834 and 1840, a child of seven and a half years was lifted into a chimney in 1873, and the mortality from cancer was still high in 1902 according to T. M. Legge.

Several published works on occupational diseases appeared in the last half of the century. Hecquet's "Dictionary of Health" was published in 1740. Dr. S. Kragge, of Upsala, in 1764 wrote his thesis on maladies of craftsmen. The Academy of Medicine of France in 1779 published many articles on occupational injuries and diseases. The *Annals of State Medicine* was instituted in Germany in 1782, which contributed largely to this subject.

The evolution of heating, ventilation and illumination was slow and unscientific from the open fires in caves to the open braziers and hypocausts of the Greeks and Romans and down through the ages to the porcelain stoves used among the Scandinavians in the ninth century.

The 17th century produced Robert Boyle, 1660, who proved that air was essential to life and combustion. Robert Hooke, in 1667, demonstrated that respiration is affected by blood changes in the lung. John Marlow, in 1668, theorized as to the chemical nature of blood changes in respiration, and Richard Lower, in 1669, oxygenated venous blood.

These physiologists paved the way for the understanding of respiration which led to the marvelous progress in the 18th century in the knowledge of air chemistry. Joseph Black, in 1757, discovered carbon dioxide. Priestly and Scheele, in 1771, jointly isolated oxygen. Rutherford, in 1772, discovered nitrogen, and Lavoisier, in 1775, discovered oxygen and the interchange in the lungs.

These researches added to the scientific knowledge necessary to understand modern heating, ventilation and illumination, and gave the impetus for the invention of industrial furnaces, gas illumination, steam and hot air heating.

The first authentic book on ventilation was published in London in 1743, "A Description of Ventilation," written by Stephen Hales. This followed G. D. Fahrenheit's invention of the 212° mercury thermometer in 1714.

Wm. Murdock of England introduced gas lighting in 1782. The next step was taken in 1784 when Argand developed the wick and the glass lamp chimney, and the candle age of illumination passed its last mile-stone.

The knowledge acquired through the researches of these early investigators made possible the understanding of factory and mine hygiene.

Sir John Pringle, in his book, "Observations on Diseases of the British Army," published in 1752, regarded "putrefaction of air as being of all the causes of sickness perhaps the most fatal and least understood." He advocated a ventilation apparatus, a bellows for alternate exhaustion and propulsion of air invented by Dr. Stephen Hales of England, a pioneer in ventilation.

In 1769 anthrax gained the proportions of a plague, and a scientific study was proposed by the Academy of Dijon, France, which offered a prize for essays on the subject, resulting in some remarkable and accurate descriptions of the symptoms of human anthrax and the anthrax of animals. Fournier, of Dijon, published his invaluable work "Charbon Galen" at this time. In 1780 Philbert Chabert was able to differentiate the forms of anthrax in man from other septic

conditions of the skin. This was the start of proving the contagious nature of the disease in animals, which honor fell to Barthelemy in 1823.

Throughout the 18th century agricultural workers were falling ill with pellagra. Gaspar Casal, a Spanish physician, gave the first account of this disease in 1762 and called it "mal de la rosa." Francis de Frappoli, an Italian, in 1772 gave it its present name. Four years later, another Italian, Piettro Verra, instituted at Milan, the Societa Patriattica which inspired a movement to aid sufferers from pellagra and from other occupational diseases among lead, wool and silk workers. It remained however for Marzari, in 1810, to attribute pellagra to corn. At Legnano, Italy, in 1784, was opened one of the earliest clinics for workers suffering from this disease.

About this same period outstanding observations were made in occupational dermatology: argyria by Zallner in 1795; dermatitis from mercury by J. Bell in 1796; and, in 1798, skin diseases of metal workers, and grocers' itch in bakers, shoemakers and grocers, by Robert Wellan, the English dermatologist.

Conditions in the congested urban factory centers of England were becoming intolerable and were instrumental in the organizing of a voluntary society named the Manchester Board of Health by Drs. Percival, Ferrier, et al, in 1796, to deal with factory hygiene and bring to the attention of the authorities in Manchester and Parliament the urgent need of reform and regulation.

These investigators laid before the public the state of the factory children, pointing out the peculiar contagious fever found among them in the cotton factories. They stressed the debilitating effect of close confinement in hot and impure air together with the long hours of labor. These contributing factors impaired the strength and destroyed the vital stamina of the rising generation and also debarred them from educational opportunities. Undoubtedly as a consequence of these and other revelations Sir Robert Peel had a bill passed in 1802, known as the "Health & Morals of Apprentices" Act.

In 1779 measures were being agitated in Italy by J. P. Frank to protect the working women before and after childbirth. Their aim was to liberate these women toilers for a period of three months before delivery.

Wm. Wilberforce in 1788 was supported in the House of Commons by Pitt, Fox and Burke, in proposing resolutions for the abolition of the slave trade. These resolutions eventually brought about the Abolition Bill in 1807 forbidding trading in slaves. In 1833 a law was passed whereby the holding of slaves in the British Dominions was forbidden, thus forever abolishing slave labor.

WHEN JAMES WATT, a Scottish engineer, invented the steam engine, in 1769, he revolutionized industry. This was the greatest achievement in power production and the beginning of the modern factory. The introduction of steam power gave England precedence over all other countries in the 18th century in the field of industrialism. It was the beginning of urban life, and as a direct result many problems in public health and industrial hygiene arose.

The spinning jenny was invented by High Kay and Hargraves in 1767, supplemented by the Arkwright spinning machine in 1771, and Cartwright's power loom in 1785. This laid the foundation for the textile industry on a large scale.

The first cotton mill in the new world was established in Rhode Island in 1770, and the cotton gin was invented by Eli Whitney, an American, in 1792.

George Stephenson, an Englishman, invented the steam locomotive in 1825, and Robert Fulton, the American, in 1807, invented the steamboat, and the Clermont made its successful trial trip on the Hudson River. These two wonderful inventions were powerful influences in the development of modern civilization. They opened up new countries, perfected rapid transportation, developed commerce, cheapened raw material, advanced new inventions and created the industrial world.

The advent of the machine age brought its toll in morbidity and mortality, not only an increase in communicable diseases due to over-crowded factory towns, but also occupational diseases from handling metals, inhaling fumes and dusts, and accidents that are common in trades and transportation.

Coal began to be used in iron smelting in the 17th century, but the invention of the steam engine gave a great impetus to coal mining for steam fuel. This hazardous trade was the cause of many occupational diseases and accidents; the coal dust, a cause of anthracosis; and the deadly suffocating and explosive gases, such as CO, CH_4, CO_2, and H_2S. Mine ventilation advanced from the heated-up shaft draft to the motor driven fans for air circulation.

The dangers of coal mining stimulated safety

measures, and caused the introduction of the safety lamp, invented by Sir Humphrey Davy. A. von Humbolt, in 1799, described choke damp and fire damp, two hazardous gases in coal mining. He devised a gas mask and a safety lamp.

John Dalton first described color blindness in 1794, which today causes the rejection of applicants as unfit for jobs in the railroad and marine services.

The closing of the 18th century heralded one of the foremost triumphs in the science of preventive medicine—the discovery of inoculation for the prevention of smallpox by Edward Jenner, of Gloucestershire, England, in 1796. The smallpox epidemics in army and labor camps were conquered and the horrors of this disease among the population of the civilized world were eliminated, and the new science of immunity was born.

Anatomy and chemistry progressed. In England and Scotland surgery was being perfected by Pott, Hunter, Cheselden, Abernathy and Bell. Great hospitals and medical schools were erected and medical practice generally made big advancements.

With the end of the Revolutionary War in America, 1775-83, a new country was established with a people who possessed initiative and inventive ability. This land, won by the colonists, had a climate and geography suitable for the white man, and an abundance of raw material, causing America eventually to become the greatest industrial country of the world.

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Insurance Against Operations

THE BRITISH Provident Association, for hospital and additional services, is an association not for profit, but its schemes are in no sense a charity, but an insurance against serious illness or operation for members of staffs of firms and persons of moderate means for whom ordinary hospital beds are not available, and who cannot afford high surgical fees or expensive nursing homes. The acceptance of the subscriber is a yearly one, leaving both the subscriber and the association free to exercise their discretion in regard to renewal year by year. The medical history should show normal freedom from physical defects or infirmities, and the policy of the association is to help with the cost of maintenance in hospital, nursing homes, payment of surgeon's fees, fees of a resident nurse in the patient's own home, and in the future with the provision of special self-contained institutions to be known as 'B.P.A. Home Hospitals.'

"There are three schemes of insurance in addition to the Founders' Scheme.

"Scheme I. is for hospital and similar services; the rate of subscription is one guinea yearly for a single person, and the benefits include not exceeding £5 per week up to three weeks towards cost of maintenance in a hospital or nursing home, half cost of treatment at the Radium Institute up to a maximum of £40, help with consultation fees, etc.

"Scheme II. gives all the services of Scheme I. with a contribution towards surgeon's fees up to a maximum of £100 for a subscription of £2 16s. 0d. for a single person, with corresponding increases for a married couple and for each child.

"Scheme III. gives all the benefits of the other two with contributions towards the fees of a consulting physician in daily attendance upon a case of dangerous illness in a hospital or nursing home, the additional subscription for a single person being 12/6 yearly with corresponding additions for a married couple.

"There is no income limit for subscribers, and in the ordinary way no medical examination is necessary, but the right is reserved by the association to require one in any particular case. The benefits are at once available wherever a subscriber lives and whatever institution or physician or surgeon he chooses to employ.

"The association is also anxious to obtain support for its Founders' Scheme by which it hopes to collect funds for the endowment of hospital beds and for the building of its own home hospitals. £1,000 is the average cost of a properly equipped hospital bed, and one bed suffices for the average needs in any one year of 100 families. This gives £10 as the unit of contribution necessary to provide the capital cost of the accommodation needed for a family; and £5 as the unit

for a single person. Every contributor of £10 or £5 as the case may be will be registered as a Founder, and will become entitled to priority of call upon the Founders' beds."—*Labour Management.*

Silicosis an Ancient Disease

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ON THE 4th day of October, last year, at the Clinica del Lavoro in Milan, Italy, was celebrated the third centennial anniversary of the birth of Bernardino Ramazzini, author of "De Morbis Artificum" published nearly 250 years ago. In honor of the occasion, two editions of this remarkable book were printed, one in Italian and one in French. Appropriate auxiliary features, exhibits, banquets, speeches and other incidents marked the ceremonies conducted by the Permanent International Commission on Labor Medicine. The United States was represented.

Ramazzini's book was the first publication of its kind in the history of occupational diseases. Published in 1700, it made special reference to one of the most ancient of workingmen's maladies, the disease of stonecutters, who "oftentimes suck in by inspiration, the sharp, rough, and corner'd small Splinters or Particles that fly off; so that they are usually troubled with a cough, and some of 'em turn Asthmatic and Consumptive . . . and in dissecting the corpse of such Artificers, lungs have been stuck with little Stones. Diemebroek gives a Curious Relation of several Stone-cutters that dy'd Asthmatic and were opened by him; in whose lungs he found such pieces of Sand, that in running the knife through the Pulmonary Vesicles, he thought he was cutting some Sandy Body."

Although today the term pneumonokoniosis applies to various forms of dusted lungs, such as anthrocosis, aluminosis, siderosis, chalicosis, byssinosis and tobaccosis, only silicosis and asbestosis are at present clearly identified as clinical entities, the other forms of pneumonokoniosis lacking complete definitions and correlation with pathological findings and chemical studies.

Among the occupations which contribute sufferers from silicosis may be mentioned: mining, cement making, sand blasting, stone cutting, blast furnace work, soap making and particularly the manufacture of abrasive soaps and powders, paper making where agalite is used in coating paper, the working of fire clay and other clays, the spray coating of plumbing fixtures, rock drilling, stone and metal polishing and grinding, sculpture, work in the cotton and textile trades, the making of monuments and tombstones, the manufacture of sandpaper, gem cutting and polishing, the glass industry, the pottery and porcelain trade, and the construction of railways, highways and tunnels.

The literature on silicosis includes the following as contributing a silica dust responsible for the disease: bituminous and anthracite coal, gold, silver, zinc, lead, copper , iron, sand, granite, sandstone, shale, silica flour and sand, feldspar, lava, silicon carbide, silundum, fibrox, French chalk, tremolite talc dust, pumice, mica, talc, asbestos, willemite, meerschaum, sodium silicate (water glass used as a filler in soaps), hydraulic lime, soap stone, serpentine building stone, aillmanite, topaz, fuller's earth, caolin, clays, ultramarine, agalite, rock dust in coal mines, cotton and textile dusts, garnet (used as watch bearings, in gem cutting, polishing and grinding), permite (used in water softening), slate, glass and many others.

THE presence of silica in the lungs of an individual at postmortem suggests the possibility of silicosis during life. The diagnosis of silicosis is based on data secured from three principal sources; the history, particularly the occupational history, the physical examination, and the roentgenological examination of the lungs. Silicosis has been recognized, at least until recently as existing, in three different stages. The "stages" are given different names by British and American workers but are essentially the same in their clinical manifestations. In the British Dominions these stages are defined by law, but in America this is not true. Not only may silicosis exist in any one of three stages but also it may be, and frequently is, complicated by other respiratory diseases, particularly tuberculosis. This complicates the differential diagnosis.

Some authorities make a differentiation between silicosis and silicatosis, the one being caused by combined forms and the other by free silicates. Our present methods of chemical analysis of the lungs do not permit of a very accurate separation of SiO and the silicates. Silicosis apparently may be produced by either when inhaled in the form of dust.

How silica produces the characteristic changes

* Radio Talk, WCFL, February 23, 1934.

in the lungs is not clearly understood. The original theory was that because of its hardness, sharpness and relative insolubility, the silica dust caused direct injury to the lung tissue, but this theory has in the main been discarded, principally for two reasons. Recent investigations have shown that the dust particles in order to be absorbed into the lung tissue must be much too small to produce a direct mechanical injury. Furthermore it has been shown that silica is not the totally insoluble substance it was once believed to be.

The modern point of view is that the changes brought about in the lung by silica are due to chemical action. It is not known whether in the lung the silica acts as a protoplasmic poison or whether its action is due solely to its colloidal properties.

The Committee on Pneumonoconiosis and the Committee on Standard Practices in Compensation of Occupational Diseases, in 1931, prepared a report on silicosis for the use of compensation boards, labor departments, and industrial physicians. Silicosis was defined as a disease due to breathing air containing silica, characterized anatomically by generalized fibrotic changes and the development of miliary nodulation in both lungs, and clinically by shortness of breath, decreased chest expansion, absence of fever, increased susceptibility to tuberculosis (some or all of which symptoms may be present), and by characteristic x-ray findings.

They reported: "For compensation purposes, any stage of silicosis that is complicated with active tuberculosis should be considered as causing serious and permanent impairment and equivalent to third stage silicosis. In order to claim compensation for silicosis, the claimant must have had the equivalent of two years' aggregate employment in an occupation or occupations involving exposure to a silica dust hazard in the state in which the claim is filed, unless the claimant was subjected to a prior physical examination authorized by the employer and at that time was not found to have silicosis."

SILICOSIS is the most costly of all the more common occupational diseases, McCord and Jones reporting that the average case of well-established silicosis costs approximately $10,000. Besides the tubercle bacilli which develop with great rapidity in tissues damaged by silica, other forms of bacteria also show this same tendency, notably the types of bacteria which cause pneumonia.

Gardner states that the penumonia rate among the silicotic laborers of South Africa is many times that in non-silicotic natives living under similar conditions.

The matter of individual susceptibility is a very difficult one to estimate; it is practically impossible to measure the susceptibility of any given individual previous to his exposure except where it is known that latent tuberculosis exists; in these instances it is now recognized that such an individual would be more prone to develop an injurious local reaction in the lungs when exposed to injurious dusts than one who is free from a tuberculosis infection. The outlook for persons who have developed well-established silicosis is very unfavorable, but even here the exercise of considerable judgment is necessary, and each case should be settled individually on its own merits.

In the protection of the worker against dust hazards, much can be done by the installation of adequate exhaust ventilation systems, which must be properly maintained from time to time, and which should remove a considerable amount of dust at the source of its production.

Proper plant housing will keep the amount of dusts in the air at a minimum. Personal protection in the form of various devices aids greatly. It is significant that not a single silicosis claim has been successfully defended in the City of Chicago, and only one has been successfully defended in the State of Illinois.

McCord and Jones recommend the following measures in foundries: (1) rotation of employees in all highly dusty processes; (2) careful physical examinations prior to employment; (3) the isolation or dust-proofing of certain departments; (4) extended good housekeeping methods; (5) where practical, substitution of other cleaning methods for sand; (6) use of dust-proof machinery; (7) installation of adequate exhaust at origin of dust; (8) adequate positive-pressure and filter types of masks and helmets; and (9) avoidance of fatigue producing practices and extended overtime work.

The problem of silicosis in industry is susceptible to control through the combined use of protective methods now available to everyone, and the proper dissemination of simple, adequate information based on scientific research. The prevention of silicosis may be reduced to two cardinal principles: (1) keep the free silica dust concentration low; and (2) limit exposure for all workers in high concentrations to one year or less.

Use of Rubber Poultice for Pain

By T. A. Lowe, M.D.
South St. Paul, Minnesota

WE HAVE had some very interesting experiences recently with sponge rubber from ¼ in. to ½ in. in thickness for external applications for the treatment of principally rheumatic backs and hips, traumatic backs, pleuritis, and fractured ribs.

Rubber, applied to any surface of the body for several minutes, will cause increased warmth in the same manner as wearing rubber overshoes. We gain two very important points in our management; namely, heat and partial immobilization. A few of many interesting cases follow:

Case 1—A man, aged 42 years, suffered with chronic polyarthritis, especially of the spine for several months. Routine treatment including streptococcic intravenous serum, salicylates, iodides and a course of mud baths was given. In spite of this treatment he continued to have trouble. He walked into the office with a distinct list and complained of severe distress in his back. A rubber pad, 18 in. long, 10 in. wide, and ½ in. thick was applied immediately to his skin, and was held in place by a flannel abdominal binder. He wore it day and night, and in about two weeks we saw him again. He was walking straight, and remarked that he was going to work and was free from pain. He has continued to remain so for the last four weeks.

Case 2—A man, 40, had symptoms identical with Case 1, but in addition to a spine condition each of the hips and knees was afflicted. Here again, focal infection had been eliminated. All of our accepted treatment for rheumatism had been tried, but with little relief. A similar rubber pad was applied to the back, and a rubber pad ¼ in. thick was applied to both hips. A heavy piece of flannel, a thin sheet of rubber, and an ace bandage were applied to each of the knees. With this management the patient had complete relief. It was necessary for him, however, to employ this treatment for weeks, as symptoms recurred on cessation of its use.

Case 3—A man, aged 35 years, sustained a sacroiliac wrench in lifting. A rubber pad was applied to his back with marked relief. He returned to his work in three days.

Case 4—A man, aged 73 years, wrenched his back in falling. On seeing him in his home the second day after the injury we noticed that he held himself in a fixed position and that it was impossible for him to be about. A rubber pad was applied to his back. He walked into the office in five days, was back on regular duty in 10 days, and has remained well since.

Case 5—A man, aged 45, had had repeated attacks of non-tubercular pleuritis for a number of years. A rubber pad was applied to the chest with adhesive tape. He reported to the office the next day with the information that nothing ever helped him in the past as much as this had.

Case 6—A man, aged 38, sustained two fractured ribs in an injury. A rubber pad was applied snugly to the chest under adhesive tape. The patient remarked that it felt firm and very comfortable. Convalescence was uneventful.

Comments—While we have used these rubber appliances in at least a hundred different cases, we realize that there are limitations. Some people can wear these rubber pads weeks without a sign of irritation to the skin, yet we have had two or three who found difficulty in wearing them. Without exception, every patient has admitted either complete freedom from pain or marked benefit. We feel that these pads can be used safely in every case.

Conclusions—Rubber pads employed in the management of arthritic backs, hips and knees, traumatic spines, non-tubercular pleuritis and fractured ribs have a definite value. They offer, we are sure, a great satisfaction to both the patient and the doctor.

Industrial Skin Diseases

THE CHIEF industrial diseases of the skin are: anthrax, the most dramatic and perhaps the least common; cancer; and trade dermatitis. Not less than 15,000 cases of dermatitis are certified by factory surgeons every year. Anthrax, chromium compounds, dermatitis in the food industry (bakers, confectioners, and jam makers) are discussed briefly.

Dr. N. Howard Mummery, in discussion, stated that the dermatoses seen in industry, with a few exceptions, were not peculiar to the occupations involved, nor were they more common among industrial employees than among the rest of the community. True industrial dermatitis was uncommon, and many of the substances handled were the same as used at home. The warm months, new workers, the state of the skin, were the important factors. "A girl might work for years at a job without any skin trouble, and then become highly sensitive to the irritant; after some months she might again become immune."
—*Lancet* (June 17, 1933)—*Abstr. A.J.P.H.*

The Medical Department Manual

—The Complete Handbook of Organization, Operation and Routines Representing Actual Experience and Practice of 20 Years—

by

HART E. FISHER, M.D., F.A.C.S.
Chief Surgeon
Chicago Rapid Transit Company

IV. Functions and Routines

THE MEDICAL DEPARTMENT:

1. Has supervision over the health of the employees of all departments in all matters that pertain to the welfare of the company, thereby protecting the company in the selection of the properly physically endowed employee safely to look out for such of the traveling public as may be entrusted to his care;

2. Examines the special senses and physical condition of all applicants for employment and makes periodical medical surveys of all employees to detect beginning diseases and potential accident hazards;

3. Administers surgical aid in time of accident, either in the department, home or hospital, wherever it is practicable, and administers to the health of the employees where the services are requested;

4. Cooperates with the safety department in medical and surgical conditions that pertain to the safety of the employee or the passenger;

5. Cooperates with the employment department in the selection of the best physically equipped applicant for the position to be filled;

6. Has direct liaison with the claim department in consultation and advice in the medical and surgical factors that pertain to claims for damages both from the public and employees, and advises with the legal department on medicolegal subjects;

7. Supervises the selection of specialists and consultant services for accident cases;

8. Examines, treats, and gives advice on cases of passengers and employees referred to the medical department before settlement; and supervises the selection of doctors in the various towns along the railroad who will be called in time of emergency;

9. Has sanitary supervision over the dining car service as pertains to the handling and dispensing of foods, also in restaurants and concessions; is responsible for the safe and sanitary conditions in which employees must work;

10. Has the direct responsibility that all materials, such as paints, chemicals and compounds used, are not a hazard to the health of the employee;

11. Installs and maintains the first aid system and conducts the first aid school for training employees in first aid work;

12. Directs the visiting nurse service to employees;

13. Has administration of the employees' sick and health insurance and a liaison with the insurance company in matters that pertain to life insurance, and cooperates with Mutual Benefit Associations and unions as its services are requested;

14. Writes articles and makes speeches on health subjects when requested;

15. Conducts research work on medical and surgical subjects that assure safety to the health of employee and passenger;

16. Performs oper-

Sec.	I.	History of the Medical Department (*Jan.*)
Sec.	II.	Physical Property of the Medical Department (*Feb.*)
Sec.	III.	Personnel of the Medical Department (*Feb.*)
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Sec.	XIV.	Industrial Medicine and Surgery; its Past and Present Status
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ations and hospital work both for the employee and passenger either in or out of line of duty as necessary.

Routines—Physical Examinations

APPLICANTS: The applicant is referred from the employment department to the Medical Department or the designated examining doctor, with an application filled out, together with an identification with the applicant's signature certified before the employment manager.

The examining doctor has the applicant sign to obviate fraud or the substitution of another man for physical examination.

Eyesight, near and far, is tested. Color sense is tested by Holmgren worsted skeins, Thompson stick colors, Williams test color lantern, and, if there is doubt, the Jennings' test for graphic record.

Hearing, near and far, is tested.

Defects of eyes, ears and throat are noted. Examination is made of the heart, lungs and blood pressure, of the urine and of the lower extremities for disabling defects. The applicant is also examined for hernia (rupture). All defects that tend to disqualify for the position for which application is made are noted. This examination is in accordance with the set standards of requirements for physical examinations, and a record of the examination remains the confidential record of the medical department, with a report sent to the employment manager.

Old Employees: Employees are re-examined for promotion or transfer to other work. A very severe examination is given in accordance with the standard of requirements for the particular position to which the employee is to be promoted.

The result of the examination is sent to the head of the department.

Annual Medical Survey—All Employees: At regular intervals all employees in all departments are examined as to their physical fitness for their respective positions, also to detect illness in time for treatment and to detect conditions before they result in injury. These examinations are made in the hospital car which is sent to the various convenient locations. Lists of employees to be examined are given to the examining physician, and the results of the examinations remain confidential records of the medical department. A report is made by the chief surgeon to the head of the department of those employees whose defects are a hazard, and each is obliged to have his defects corrected either by his own physician or the company physician. A record of all defects is made on observation cards; these are used to call employees in the future for examination and observation.

Surgical Service—When employees are injured while on duty, they are sent to the medical department or to the geographical company doctor. All the necessary surgical attention is given for the particular injury. A record of the injury is made at the medical department and a report sent to the claim department, together with bills for services, if any, as from the outside physician. A report on the injury is also transmitted to the safety department and to the department head. If the employee is sent to a hospital or to a specialist for service or for surgical apparatus or appliances, he is given an order therefor by the medical department. All x-ray pictures made are filed in the medical department. If a patient is to return for subsequent treatment, he is given an order with the date on which he is to return and the doctor he is to see. The man also takes with him his surgeon's order and must bring it with him for each subsequent treatment.

When the individual case is completed a regular case history is sent to the claim department for use in future court or compensation litigation. If the man is ready to resume work, he is given an O.K. which he hands to his foreman on reporting back to work.

Medical Service—Health: This service includes all cases of illness that the worthy employee wishes the medical department to treat, and is given gratis. When the patient resumes work he is given an O.K. to give his department head or foreman. When he first comes to the medical department he brings with him an order, which is a request for service. This service includes all injuries that occur off duty. Those employees who have defects that require observation and treatment, found at the time of the medical survey, are taken care of under this service; and under it, also, glasses are fitted at cost.

Outside Physicians—Hospital and House Calls: Outside physicians, called on emergency cases, fill out a report of any employee's injury and mail it, together with their bill for services, to the chief surgeon or to the claim department.

The chief surgeon and his assistants, on hospital and house calls and operations, fill out the

same form as for office cases, and all medical bills are passed on by the chief surgeon.

Routines—Sanitary

INSPECTIONS: At regular intervals a sanitary survey is made of all physical property, such as cars, dining parlors, offices, shops, terminals, restaurants, concessions, etc., to determine the sanitary conditions, and the findings are sent to the general manager and president. Sources of water supply for culinary and drinking purposes are tested and reported to the State Board of Health, and certificates of purity received. Tests of milk, foods, ice cream, etc., are also made to avoid contamination. Formulas of paints, cleaning compounds, chemicals, etc., are tested, and close scrutiny is made to avoid using anything that may be a hazard to employees. This inspection is always made by the first aid director.

FIRST AID INSPECTIONS: These are made, at frequent intervals, and also by the first aid director, of all first aid stations as to the nature and completeness of the equipment. The findings are reported to the chief surgeon, and a typewritten report is made to the president and general manager. A record is kept of all aid given from the first aid stations, and when the card is filled it is sent to the medical department. Each week a first aid requisition is sent to the medical department for material needed in the first aid stations.

FIRST AID INSTRUCTION classes are held at regular intervals for both men and women employees who are selected by department heads. The course requires attendance to a total of 16 hours.

An examination is conducted and a diploma given to each graduate. Instruction is given by the first aid director, who also has charge of the training and demonstration work of the men's and women's drill teams.

RESEARCH WORK: Through the chief surgeon, active research work is being carried on. One achievement is the non-adhering gauze dressing perfected in the medical department. Research work was done on the greaseless kerosene known as "Kerine." Work has been completed on the auditometer for testing hearing. Research was made on the use of mercurochrome for treating injuries, instead of iodine. In the course of experimental trial at the present time are a glare reducing glass for motormen, a welding goggle for arc welding and a new safety spectacle for prevention of injuries to eyes. Research attention has been given to electric shock and the evolution of resuscitation.

Routines—Visiting Nurse and Clerical

VISITING NURSE: A daily record of absentees is sent to all department heads and the chief surgeon. The visiting nurse calls on these sick employees and makes her report to the chief surgeon, and a typewritten report is sent to the department heads giving only the probable day of return to duty.

CLERICAL: A daily record of work and its various classifications is kept in the medical department. A monthly report is made to the president and general manager of the work accomplished during the month with a comparison of the same month the previous year. An annual report is made for the president and the general manager, with a comparison of the previous year's work, and the cost of the medical department.

Record is kept of expenses of the first aid system, and reports are made to the various companies that enjoy this work.

Duties of the Chief Surgeon

UNDER the direction of the president and his representatives, it is the duty of the chief surgeon to administer the medical department in a manner that assures the best possible medical and surgical service to both employee and passenger. He has charge of all executive and administrative work in the department and has direct liaison with the other department heads. All consultation, operative and specialized surgical work is his chief work; all standards of physical requirements and the method of applying the same are his particular business. Research work and the direction of all other activities are immediately under his control. He takes care of all claim and medical-legal duties. All other employees in the department are responsible to him in all their decisions and practices. The purchases of departmental supplies and office expenditures are passed on by him before final decision.

ASSISTANT TO THE CHIEF SURGEON: Under the direction of the chief surgeon, it is the duty of the assistant to the chief surgeon to be responsible for the work and practice of the other medical and professional help in the proper discharge of their daily duties, and to act as the representative of the chief surgeon during his absence and to decide matters that arise during that time. He also makes calls on employees at

home in accident cases and at the request of the claim department.

Assistant Surgeon — First and Second: Under the direction of the chief surgeon and the assistant to the chief surgeon, their duties are purely of a surgical nature, rendering surgical treatment to passengers and employees. It is their duty to make calls on injured employees and examinations of passengers when requested by the claim department or ordered by the chief surgeon.

Assistant Surgeon—Third and Fourth: Under the direction of the chief surgeon and the assistant to the chief surgeon, they have charge of all eye, ear, nose and throat work. If qualified, they perform operations on the eye, ear, nose and throat, and assist specialists in all work that is done outside of the medical department. It is their duty to help in medical and surgical cases where needed, and to make calls on employees and passengers when requested by the claim department or chief surgeon.

Assistant Physician—First, Second and Third: Under the direction of the chief surgeon and the assistant to the chief surgeon, the physicians make all physical examinations of applicants for employment, conduct the regular medical re-examination of old employees in the hospital car and in the office, take care of all medical cases of employees, and make calls on injured employees and passengers when requested by the claim department or chief surgeon.

Surgical Nurse: Under the direction of the chief surgeon and his assistant, the surgical nurse has full charge of the sanitary features of the medical department, maintains the offices in a clean condition, attends to all sterilization, using the large steam sterilizer, and prepares all sterile materials.

Laboratory Technician: Conducts all urine, blood and chemical tests, tissue examinations and conducts metabolism tests.

Physiotherapy Nurse: Under the direction of the chief surgeon, his assistant and the surgical nurse, she assists the surgical nurse in departmental sanitation, assists doctors in examinations and surgical dressings, prepares first aid supplies, gives all electrical and mechanical physical therapy treatments, and makes outside nurse calls on employees whenever the same are necessary.

X-ray Technician, Registered Nurse: Under the direction of the chief surgeon and his assistant, she has complete charge of the x-ray laboratory, doing roentgenographic work, developing and filing films and preparing patients for fluoroscopic work for the chief surgeon.

Visiting Nurse (One): She makes visitation calls on sick and injured employees and reports her findings to the chief surgeon and the department heads. She also contacts all of the sick and health insurance cases.

Outside Company Physicians: These doctors are not employed on a salary basis but are subject to call from the chief surgeon, the claim department and the legal department for emergency work in accidents to employees or passengers, or for examinations of employees or passengers.

First Aid Director: He has charge of the first aid service, of the teaching in the first aid school for employees, of organizing and training first aid drill teams, of making sanitary inspections of property and first aid inspection of all first aid stations, and of sending out all first aid supplies requisitioned by first aid stations. He also has charge of the reaction time tests.

Secretary: The secretary does all stenographic work, has charge of all correspondence, files and office routine, and is responsible for all bills, receipts and requisitions for supplies and for all reports of injury to the claim department. She also has control of the visiting nurse.

Chief Clerk: Under the direction of the secretary, the chief clerk has charge of the filing system, assists in stenographic work, meets the patients in the reception room, and is responsible for the many reports and office routines, such as visiting nurse reports, daily reports, safety reports and case histories. And the stenographer takes dictation and attends to all correspondence, assisting the other clerical help in general office routines.

V. The Centralized Medical Department

(For *Chicago Rapid Transit Company; Chicago Aurora and Elgin Railroad Company; Chicago North Shore and Milwaukee R. R. Co.; Chicago South Shore and South Bend R. R. Co.; Public Service Company of Northern Illinois; et al)*

WE RECOMMEND the following:

1. That each company concerned authorize the establishment of a medical department, if such a department is not already in existence.

2. That the medical departments of the companies concerned be combined into one department.

3. That the name of the organization be "Medical Department" and the names of the companies served appear in alphabetical order on the headquarters entrance.

4. That the headquarters of the centralized medical department be located at 79 W. Monroe St., Chicago.

5. That the functions of the Medical Department be defined by executive order in each company.

6. That Dr. Hart E. Fisher be named as chief surgeon by each company and his duties defined.

7. That the salaries of the chief surgeon and his staff at headquarters be carried on the payroll of the Chicago Rapid Transit Company and that all salaries be paid by this company.

8. That each company be charged an annual retainer which shall be at the rate of $— per employee, this retainer to be based on the number of employees in the company service as of January 1 each year.

9. That the costs of operating and maintaining the Medical Department include charges for depreciation of equipment and funds for research and allied work. The depreciation should be figured at 10% per year on the present valuation of $— and the total research charge should be $— per year for all companies.

10. That the monthly billing to the various companies be made on the following basis: From the total monthly cost of the department there should be subtracted a sum equal to 1/12 of the annual retainer; the remainder should be divided by the total number of cases handled during the month to obtain the unit case cost; each company should be billed for the number of its cases handled at the unit cost rate for the month. Each company should also pay for first-aid treatments, medical examinations, and special services rendered by local physicians or surgeons.

11. That the surgical, medical office and other equipment at headquarters be the property of the Chicago Rapid Transit Company.

12. That periodical reports of the medical department be prepared and submitted to the managements of the companies served.

There is hereby created the medical department which shall have complete charge of and the full responsibility for all medical, surgical, and related work of the company. The headquarters of the medical department are located at 70 W. Monroe Street, Chicago. The medical department shall be under the immediate control of the chief surgeon who shall report to. . . .

The duties of the chief surgeon shall include the following:

(a) General administration of the work of the medical department;

(b) Selection and supervision of physicians, surgeons, consultants, nurses, clerical staff, and the assistants required for the necessary operations of the department;

(c) Selection of all medical, surgical, first-aid, and other supplies and equipment, and their standardization;

(d) Approval of all bills and fees for hospital, nursing, medical, surgical, or related services rendered;

(e) Issuance of medical supplies and equipment;

(f) Preparation of periodical reports of work done and results accomplished;

(g) Preparation of physical examination records, and the maintenance of health, accident, and similar records, and their custody;

(h) Examination of applicants for employment, re-examinations, periodic and special examinations of employees, and the determination of examination standards;

(i) Rendering of first aid in accident cases and such subsequent treatment as may be necessary;

(j) Rendering of such medical, surgical, or related services as are required in connection with accident liability cases;

(k) Arranging for hospital and nursing service for medical or surgical cases;

(l) Giving consultation and professional advice to employees;

(m) Inspection of working conditions as to their effect on the health of employees;

(n) Inspection of such service rendered by the company as may have an effect on the health of employees or the patrons of the company;

(o) Cooperation with department heads and others in the reduction of absence caused by illness of employees;

(p) Professional services of a charitable nature when authorized by company officials;

(q) Analyses of chemical compounds, drinking water, paints, varnishes, lubricants, etc., for harmful ingredients;

(r) Approval of accident and health benefits from company insurance or employee benefit associations;

(s) Assistance to the legal and accident liability departments in connection with claims;

(t) The giving of such professional advice and assistance as may be required by the safety department in the conduct of its work; and

(u) Complete charge of medical features of employees sick and health benefit insurance.

VI. Subjective and Objective Relations

THE SUCCESS of the Medical Department of any industry depends largely upon the cooperation and good will of the executives and officials of the other departments of the company, without which it cannot function efficiently and render the service for which it is established. The work of the Medical Department has a decided bearing on the activities of many other departments in that the physical conditions of the employees is reflected in the results produced.

Employment Department

THE Medical Department makes its initial contact with the employee through the employment department. Close cooperation between the chief surgeon and the employment manager is necessary in establishing the standards of physical requirements for the different lines of work. The attitude of the employment department toward the Medical Department must be favorable if the applicant is to receive a good impression of the doctor who examines him. If he passes the examination, he is sent back to the employment department, where he is informed of his physical fitness to do the work; if he is disapproved on account of some physical defect, he is likewise informed by the employment manager of the reason for his rejection. The employment department should never make light of or criticize the findings of the doctors conducting the examination, and each department head should back up the decision of the other. It is the duty of these two departments to select the very best material possible for the positions to be filled, in order to assure the industry of a permanently healthy and efficient employee body.

Safety Department

THE duty of this department is to detect accident hazards and to take the necessary steps to eliminate the possibility of injuries. When an unsanitary or hazardous condition is noted, the matter is taken up with the chief surgeon. The hazards of a particular work are explained to him by the safety engineer and they determine the physical requirements of the man to do the work. The fatality and severity rate of accident is important information to the Medical Department in determining if the employee's health was the indirect cause of the occurrence, and suggestions are made to the safety engineer so that measures may be instituted to correct the condition. Many times the safety engineer will call upon the Medical Department to aid him in arriving at the cause of an unusual occurrence.

When an injured employee or customer calls at the medical department for treatment after an accident, a record is made of the injured's statement as to how the accident occured and a copy of the same is forwarded to the safety engineer with a detailed report of the injuries received and possible length of disability, as often the statement to the doctor is correct only to be changed later by the patient. In the post mortem of an accident, it is imperative that the doctor be present at the hearing as he can give valuable information.

The Medical Department cooperates with the safety department in devising methods to protect employees in their work Our department now is at work on a special device for eye protection, and study is also being made of the causes of accidents due to mental conditions.

Claim Department

IN THE daily operation of large industries, such as are served by this department, there exists two forms of liability, employee and customer or public liability. The former deals with claims for personal injuries received by employees while on duty, and the latter with claims for personal injuries received by passengers, or customers, while on the company's property. The medical department is called upon for service in both cases.

The injured employee is given competent medical treatment and subsequent attention, and when he has recovered the doctor determines the disability or deformity that will remain permanently and advises the claim department what they will be obliged to pay for in damages. In settling employee cases before the Workmen's Compensation Board, the medical department assists in the preparation of the case and at the hearing. In most cases the employee has been cared for by this department and friendly relations have been established, so the hearing before the board is conducted in an amicable manner.

In the case of the injured passenger or customer, proper medical and surgical services are

rendered until the liability is determined or until the patient seeks aid elsewhere. When the patient has recovered, the claim department is advised of the extent of the injuries and settlement is made accordingly. The claim department also looks to the Medical Department for advice as to the reasonableness of bills rendered by outside physicians, and, when consultation or specialized services are desired for customer cases, for recommendation as to who is qualified to act in the case at hand. Great care is taken by the Medical Department to see that no friction or antagonistic feeling arises between outside physicians and the claim department, as, by securing the cooperation of the patient's family physician and the good will of the injured person, a settlement can be made that is satisfactory to all concerned, more advantageous to the patient than if he placed the case in the hands of an ambulance chasing attorney.

Legal Department

WHEN personal injury cases cannot be settled out of court by the claim department, they pass into the hands of the legal department. Here, too, the Medical Department is called upon to assist in the preparation of the case and to furnish expert medical testimony at the trial. Many other legal matters arise that require the assistance of the Medical Department.

Insurance Department

WHERE a company carries health and accident insurance for its employees, the Medical Department is called upon to pass on the authenticity of the statement of claim before it is forwarded to the insurance company, obtain supplementary reports of continued disability from the physician attending the case and secure his cooperation, determine the period of incapacity of the employee, devise ways and means of reducing absenteeism from work on account of illness, examine employees as to their physical fitness to resume their regular work after injury or illness, and act as an arbiter in the settlement of claims between employees and the insurance company.

Other Departments

IT IS absolutely necessary that the Medical Department receive the cooperation of the officials of all departments if it is to gain the confidence of employees. The work of this department extends beyond the actual treating of medical and surgical cases. Many matters are brought to our attention outside of our regular line of work through our personal contacts with employees. As an instance, if an employee is ill and in financial distress and so informs this department, we take the matter up with the proper official to see that assistance is forthcoming. In the event of an employee being unable to continue his regular duties on account of ill health the Medical Department advises his department executive and the man is placed at some work he is able to perform.

The excellent cooperation that has been extended by the executives and officials of the different industries served by this department is responsible for our great success, and that same feeling of confidence exhibited by officials has been adopted by employees. This cooperation is known as employee relations.

Employees' Associations, Unions, Etc.

THE Medical Department is called upon to render service, as the occasion may arise, to members of employees' Mutual Benefit Associations and labor unions. From their long association with the Medical Department and knowing there is no ulterior motive back of our medical policy, they are only too glad to give us their support.

There is another form of cooperation which is necessary for the harmonious existence of a medical department, and that is what is termed public relations, referring to customers of the industry, physicians in the community served by the industry, hospitals located in adjacent territory, and civic, municipal and Federal authorities.

Municipal, State and Federal Authorities

IN ORDER to obtain the cooperation of municipal, state and Federal health authorities, they in return must receive cooperation from the medical profession and industrial medical and surgical men. Our department abides by the rules established for sanitation purposes. All cases of contagious and venereal diseases are reported to the health department, as required. Our employees are encouraged to live up to the measures governing disease and quarantines, and in case of epidemic disease our cooperation is always of first rank. Literature of a nature helpful to employees' health, received from the health commissioner, is distributed as requested.

State authorities request cooperation in the filing of periodical analysis of the water supply used for state and interstate transportation, re-

ports of industrial disease, if any, and of medical inspection for prevention of industrial illness, reports of sanitary food handling, etc. Observance of state laws regarding the use of alcohol is closely maintained by this department.

We adhere strictly to laws covering the use of narcotics and alcohol in the department, as required by national authorities, and all reports are filed promptly. The desire of the Interstate Commerce Commission that suitable first aid supplies be carried on our trains was anticipated and was put in effect on our railroads 10 years before the law was passed. The practice of separating ice from water on railroad cars was established as soon as the request was issued.

These examples are cited to show that if an industry is to enjoy the cooperation and assistance of municipal, state and national health authorities, it must be willing to abide by their laws and rules and extend all possible aid in return.

Community Physicians

ON ACCOUNT of the widely scattered locations of the various industries served, it is impossible for the personnel of this department to take care of all employees and customers. In selecting an outside staff to answer emergencies and conduct examinations, it is best to choose men who are representative in their locality and members of hospitals in their territory to assure efficient service. To avoid dissatisfaction among the members of the medical profession, a change of doctors should be made frequently rather than to give all the work to a favored few, as the cooperation of outside physicians is essential in the operation of an industrial medical department. Each member of the personnel of a Medical Department should belong to a medical society in his district and establish friendly relations with the other members.

Community Hospitals

IT IS necessary to establish harmonious working relations with hospitals in order to obtain the best of hospitalization and care for patients. As the activities of our companies extend into four states, we have affiliations with hospitals in each locality, and where possible those that are approved by the American College of Surgeons. The hospitals are guaranteed that their bills will be paid, and in return they render first class service. There should be no discrimination between hospitals, the sick or injured employee or passenger being taken to the one closest at hand. It is a great advantage to the Medical Department to have the doctors affiliate with one or more hospitals as a staff member and become acquainted with the hospital and its personnel.

Customers and Passengers

HERE the chief surgeon and personnel of the Medical Department must exert the greatest tact and courtesy to gain the confidence of passengers injured on the companies' property, as that old feeling of suspicion of company doctors and their ulterior motives must be dispelled. Each customer should be treated with consideration and given the best of service and attention. Take them into your confidence, consult with their doctor, do not permit your claim agents to make a settlement until they are recovered from their injuries, keep them as friends after all settlements of claims are made, and in that way establish and maintain friendly public relations.

Medical Societies

IT IS only by association with local and national medical societies that one can keep abreast of medical progress. It has been our aim to cooperate with medical organizations, local, state and national, and follow the ethics as promulgated by them. Services, such as making talks, etc., are offered by this department to the educational committee of the State of Illinois Medical Society, and movements that are for the good of society and the public receive our support.

VII. Research in Industrial Medicine and Surgery

THE physician or surgeon, desiring to make a study of any special subject in which he is interested, has a fine opportunity to do so with the vast amount of material, both medical and surgical, that can be obtained from the large number and great variety of cases that are treated in the daily routine of a large industrial Medical Department. An added advantage is the fact that if a case presents itself which is of special interest to the physician or surgeon, it can be followed up and kept under observation from its inception through convalescence until the patient is discharged, and the fact that the patient is in the employ of the industry makes it possible to call him in for observation more frequently than if he were a private patient.

The doctors in our medical department are

encouraged to interest themselves in research work of some particular subject, and at the present time the various kinds of cases in our files, which contain record cards of over 800,000 patients, are being classified so as to make the desired information easily accessible. Some of the rarest and obscurest diseases in medical history have been discovered from the research work of this medical department, as well as abnormalities of anatomy and function, and many interesting blood and urine findings.

Provision has been made to make a photographic record of all unusual and interesting conditions in the future.

One of the first problems arising in the early days of this department was to determine the most efficient of all known burn dressings. As a result of this study a non-adhering gauze was perfected and reported to the medical profession.

Following this, the parafine treatment of burns was experimented with and developed in this department.

Having met with success in these two problems, we next worked on a substitute for plaster of paris for making casts. After extensive work, a light, firm cast material, made from paraffine, stearine, water glass, and a glue compound, was developed. However, this material having the same disadvantages and no greater advantage than plaster of paris, it was decided that the latter was more practical. We have recently learned that a substitute for plaster of paris has been placed on the market.

Study was made of treating lacerations and infections resulting therefrom, and a treatment was arrived at which to our minds gave excellent results. A routine treatment for electrical burns in all stages and electrical flashes to the eyes was also established. It is essential that routine methods of treatments be followed rather than to allow each of the doctors to carry out his own idea of treatment. In this way industrial officials are aided in arriving at the probable length of disability for the various conditions that arise in industry.

In compliance with a request of our safety department that we make a study of eye protection in industry, a spectacle frame was devised which fits around the contour of the nose and orbit so closely that no foreign body can reach the eye in any way. The frame is composed of horn and has the appearance of a high grade spectacle frame. Into this is fitted a non-breakable armor plate glass which is ground to correct the errors of refraction of the employee's eyes, permitting him to wear his protective spectacles both at home and at work.

An anti-glare spectacle to protect the eyes of employees engaged in welding was also perfected. It is now in its sixth year of experimental use and is about to be adopted universally.

A shield to protect the eyes of employees engaged in welding was also perfected. It is also now in its sixth year of experimental use and is about to be adopted universally.

A shield to protect the eyes of motormen in high speed railroad operation from glare is still in the formative process, and at the present time we are experimenting with a glass which is placed in front of the motorman permitting visibility for operation and clearness of the red and green signal interpretations, and which also reduces the ultra-violet rays from arc headlights at night and the sun to a minimum. Glasses made of an opaque material of one-half hemisphere were also devised to protect employees working on sleet removal from trolley rails and from electrical flashes, at the same time permitting them to see in the dark.

Research work in electric shock and resuscitation was commenced before the war, but owing to the absence of the chief surgeon during this period the work was discontinued. However, preparations are being made to complete it and it is well under way.

In order to safeguard the companies and employees engaged in the rapid transportation industry as well as the travelling public, it is essential that some means be established whereby it can be determined whether or not a man is fit to be employed as a motorman or motor coach operator, not only from a physical but mental standpoint as well. We are now experimenting on a test as to time of reaction, muscular coordination, fatigue, observation and visual and auditory stimulus, and hope to derive sufficient data from which to establish a routine examination for employees engaged in hazardous occupations. This research work is still being carried on.

A careful study is under way as to the cause of high arterial tension—not attributed to organic lesions.

It is my opinion that medical departments, such as the one here described contribute infinitely more to the progress of industrial medicine and surgery than do those which are concerned solely with the treatment of injuries after accidents.

Here and There in the Law and the Literature

—Items of Interest in Industrial Medicine—

Nickel—Eczema

GOLDMAN describes the cases of two nickel workers with definitely proved nickel eczema. In each the eczema developed after a brief period of contact, two days in one case and three days in the other. These patients exhibited a remarkable idiosyncrasy to the nickel ion. Both gave negative reactions to cobalt solutions and to lime. Both patients experienced previous allergic disturbances, urticaria in one instance and hay fever in the other. One patient exhibited a strong reaction to a nickel coin. The author discusses the practical value of nickel coins and nickel-plated objects as potential eczematogenic agents and suggests that these be considered in the study of some of the eczemas of the hands with heretofore unknown etiology.—*Archives of Dermatology and Syphilology* (November, 1933).

—and Dermatitis

TWO YEARS ago, Lain reported three cases of dermatitis due to spectacle frames made of white gold, an alloy containing nickel. Since then I have seen a patient who had not only a similar dermatitis from spectacle frames but also an eruption due to a nickel-plated wrist watch.

E.G., a man, aged 24, a clerk, consulted me March 10, 1932, for a vesicular and crusted eruption limited to areas where his spectacle frames were in contact with the skin. The affected areas included horizontal streaks along the temples and small patches on the ear lobules, the postauricular region and the left inner canthus. He also presented well defined erythematosquamous patches on the front and back of the right wrist, where his wrist watch had been in contact with the skin.

The patient since childhood had worn spectacles for nearsightedness. He had always used spectacle frames made of tortoise shell until six months before, when he changed to frames made of "white gold." About six weeks before I saw him, he noticed that the rims of the spectacles were beginning to tarnish and a week later the eruption appeared on his face. This disappeared completely in three or four weeks after he discontinued the use of the white gold frames. One year later, the eruption had not recurred.

The patient had also worn a nickel-plated wrist watch for the first time in his life during the past 10 months. At the end of four or five months an eruption appeared on the back of the right wrist, and the patient noticed that a good deal of the nickel plate had become worn. He discontinued wearing the watch and the eruption promptly disappeared. One month later he again wore the watch on the back of the wrist and for the second time an eruption appeared in this locality. He changed the watch to the front of the wrist and this was also followed by an eruption confined to the area where the watch had been in contact with the skin. He stopped wearing the watch entirely, but since that time (three months) the eruption had persisted on both the back and the front of the wrist. He was given three fractional doses of unfiltered x-rays at weekly intervals with moderate improvement. He then disappeared from observation but when seen a year later (April 12, 1933) he stated that the eruption on the left wrist had disappeared one week or so after the last x-ray treatment and had not recurred.

It is well known that certain individuals are sensitive to nickel and after sufficient contact with this metal develop a dermatitis. This case is plainly one of contact dermatitis in such a person, as the eruption appeared at points of contact, disappeared on removal of the causative agent, and reappeared on subsequent contact. The persistence of the patches on the wrist simply indicated the high degree of sensitivity which repeated contact had produced. — Dr. Howard Fox, *J.A.M.A.* (September 30, 1933).

Trauma and Epithelioma

MORAN STATES that there is no experimental evidence that an epithelioma can be produced at will in a healthy subject by a single act of trauma. A single injury is capable of being a determining factor in the causation of epithelioma when applied to a precancerous lesion. An injury to an epithelioma may increase the rate of growth and the rapidity of generalization. Violence to a part in a subject suffering from a generalizing epi-

thelioma may determine a local metastasis. Although the factor of coincidence must be of importance, one is not justified, from the present knowledge, in denying the likelihood of casual relationship between trauma and epithelioma, provided, in the circumstantial evidence brought forward, certain postulates are satisfied.—*Medical Journal of Australia* (October, 1933).

Medical Practice

THE PRACTICE of medicine as now conducted presents very many different problems from those of 25 to 50 years ago. As an example of present day difficulties consider that an enormous section of the population is receiving free treatment for every kind of illness. In the past most of these people were taken care of by individuals economically able to look out for their employees, their servants and those who worked for them. A large number of the contemporaneous populace pay for minor sicknesses but they can not or will not pay for severe or long continued illnesses. Figures vary, but probably about 45% of the population of this country have incomes under $1500 a year, a sum insufficient to pay for even the most incomplete and most inadequate medical care. Pottenger states that 79% of the population of San Francisco have incomes under $2000 so that they are unable, when ill, freely to consult the doctor. This leaves approximately only 21% who might be considered able to pay for complete medical care. These startling statistics show the way in which the changing trend of medical practice has turned.

Infant mortality has been reduced nearly 60% in 20 years. Life expansion has jumped 18 years in the past four decades. Nowadays a very considerable part of the practice of the physician consists in the taking care of old people who are economically dependent and who have to call on others for their very sustenance. The increased bacteriologic and epidemologic knowledge and advances in sanitary arts have reduced the field of short lived infections, which made up the bulk of the doctor's practice some years ago, the type of disease which the sick man could readily finance. There has been a very large increase in the functional disorders, expressions of disease which are not cured in a day, a week, or a month, but often require long periods of careful attention by the physician.

These changing types of practice indicate definitely why in this present era the doctors are having difficulty in making a living. Some change will have to eventuate in the practice of medicine in order to permit the doctor to live in a manner which will compensate him for the years of study that he has given to the learning of his profession, and the thousands of dollars that have been spent in obtaining this medical education. He should be able in his active days to put money enough aside to give him surcease from worry in his old age. The way things are going at the present time, this is possible for only an exceptional few. How best to make it possible for the entire profession, or at least the deserving members, to obtain proper and sufficient emoluments is a problem which confronts the leaders of our profession.—Editorial, *New Orleans Med. & Surg. Journal* (September, 1933).

—Industrial Medical Problems

INDUSTRY is very much concerned about the formidable array of physical dangers of the life span beyond 60 or 70. Especially is this true of changes due to arteriosclerosis, syphilis and other disorganizing agencies which produce the same. Here is where history again becomes important as we review the problem case under consideration. Why is the history so important? It is because we want to know of infection, also the early manifestations of the changes that go to make up the symptom complex. In organic diseases of the brain the history will usually show the following symptoms: headaches, insomnia, restlessness, irritability, fatigability, dizziness, fainting, weakness, perhaps palsies—transitory or permanent—varying in degree and kind. Of these transitory palsies, aphasia is quite common, also amnesia and not infrequently monoplegia. The mental defects are usually first shown in memory changes, then faulty associations, over-suggestibility, stubbornness, suspiciousness, confusion, disorientation. Perhaps delirium, stupor, coma and death end the sad drama. Industry takes cognizance of this group of cases of arteriopathic origin, largely because of the problems of retirement from vocational activities and the estimate of service value to the concern should they not be retired. The clinical pathology is variable in each case, but the fact remains that "a man is as old as his arteries." Whether psychotic symptoms appear in greater or less degree depends upon the clinical pathology, its degree, location and apparent chronicity. Fully to estimate the clinical factors in the old age arteriopathic case, it is necessary to hospitalize the patient and carefully

study the problem. Here is where responsibility in adjustment to the needs of the case, both as to clinical and employment needs, is thrust upon the physician—*International Journal of Medicine and Surgery*, XLVI: 279 (June, 1933).

—and Some Common Industrial Hazards

HAYHURST has summarized some of the common industrial health hazards as follows:

1. It requires industrial health hazards to produce occupational diseases. Therefore, data on occupational diseases help to define such health hazards.

2. Standardization of reporting forms is advised as well as laws requiring the reporting of occupational diseases, irrespective of compensability.

3. It is considered that among the commonest industrial hazards are the following, which are discussed in some instances with statistics:

(a) The poisons—particularly lead, volatile solvents, and irritants including corrosives.

(b) Fatigue—which even in a period of depression is still a matter of unrestricted hours, night work, child labor, female labor, and a consideration of strain of bodily parts, particularly noticeable as tenosynovitis.

(c) Dust—which at present involves chiefly silica and silicates used extensively in various industries and requires common sense methods of control before refinements in certain particulars.

(d) Air conditions—which hinge upon the subject of temperature, atmospheric, cooling power, and effective radiation, the latter of which is stressed both because it is a rather new discovery in physiological relationships and because it is often of the greatest importance in comfort and efficiency—*American Journal of Public Health*, XXIII:1083 (October, 1933).

Survey of Miners' Asthma

A SURVEY of miners' asthma now under way by the United States Public Health Service at the invitation of Governor Pinchot marks the first concrete step in carrying out the recommendations of the Commission on Compensation for Occupational Diseases.

This survey represents the first joint effort of miners and operators to cooperate with a fact-finding agency in determining the extent and importance of chronic incapacitating miners' asthma. It will affect over 100,000 miners in the anthracite regions of this state.

Pennsylvania is the first state to make a complete and scientific study of this subject prior to the introduction of legislation along these lines. The first 1000 copies of the Commission's report have already been exhausted, and 4000 additional copies are now available.

In expressing his appreciation of the promptness with which the United States Public Health Bureau began work on the project Governor Pinchot said:

"The possible hazard to the miners' health due to breathing dust found in anthracite mines has long been a bone of contention between miners and operators. That both groups have signed an agreement to cooperate with so scientific and impartial a group of authorities as is represented by Dr. R. R. Sayers and his staff of assistants in the United States Public Health Service is a matter of great personal satisfaction to me."

The agreement between miners and operators permits the United States Public Health Service to select the mines and the employees to be examined. It provides that information gained during the survey as to any individual men or groups of men is not to be disclosed to the employees nor to the employers. It also provides that the general results of the survey are to be made public in a report to be published by the United States Public Health Service—*Pennsylvania Monthly Bulletin*, Dept. of Labor and Industry, XX:2 (August, 1933).

—Lead and Zinc Miners' Silicosis

FROM July 1, 1927, to June 30, 1928, 7,722 miners received a complete physical examination, a rotentgenogram of the chest, a Wassermann test, and if pulmonary disease is suspected a sputum examination. Blood counts and urine examinations were done as necessary.

Of the men examined 99% were American born whites ranging in age from 16 to 78 years. More than 42% were from 20 to 29 years of age, the same age period during which the majority of them started underground work. The latter factor has been considered important in determining the incidence of silicosis. Of those who began to work under the age of 30, 20% developed disease, while of those over 30, 24% were affected. The incidence of both simple silicosis and that complicated by tuberculosis was higher in men who gave a family history of tuberculosis.

Of the total group of 7,722 miners, 1,647 or 21.3% had silicosis; 1,362 were classified as first stage, 253 as second stage, and 32 as third; 276

had silicosis with tuberculosis and 104 had simple tuberculosis. The dust concentration bore a direct relationship to the development of silicosis. Men working at the face were eight times more liable to silicosis than those employed elsewhere. During the past 13 years the dust concentration has been considerably decreased by the application of wet methods.

Among the group there were 599 who had previously worked in coal mines. There was no evidence that coal dust protected against silicosis with or without tuberculosis.—Abs. U. S. Bureau of Mines Tech. Paper No. 545, 1933, in *Journal of Industrial Hygiene*, (July, 1933).

—and Effects of Cement Dust

RUSSELL has reported on the effects of cement dust upon workers, an investigation being conducted upon 570 workers.

The purpose of this investigation was primarily to measure in terms of physical condition and disabling sickness the effects upon the workers of exposure to known quantities of cement dust. The study was conducted throughout a period of nearly three years. The workers were examined twice during this period and, where indicated, special examinations and x-rays were made. If an employee remained away from work on account of illness the exact nature of the illness was ascertained.

In the mill where the investigation was conducted the air contained from 22 to 63 million particles per cubic foot of air. These particles were not larger than 10 microns. Chemical analysis showed that cement contains about 62% lime and 22% silica. Other constituents are alumina, iron oxide, magnesia, and sulphur trioxide. Petrographic analysis showed that the proportion of free silica (quartz) varied from 6.5% in the crusher-house to 1% in the finished cement.

The conclusion arrived at from a tabulation of the results showed that the frequency of respiratory diseases was twice as great as in the non-dusty industries. Diseases of the skin gave a high rate of disability. Furunculosis was the cause of 70% of the absences due to skin disease. Conjunctivitis was the most frequent disability of the eyes. Of 570 workers examined, 21, or 3.7% were diagnosed as having pulmonary tuberculosis. In only two cases, however was the disease active at the time of the first examination and each progressed as a result of the exposure to dust. Both had contracted the disease prior to their work in the dusty atmosphere. The other cases apparently had healed lesions and none showed activation during the period of observation.—Abstr. *Journal of Industrial Hygiene* (September, 1933).

Compensable—Typhoid

MILLS, in the course of his employment, contracted typhoid fever by drinking contaminated water furnished by his employer. He sued for damages. His employer filed an answer, contending that Mills should make his claim under the workmen's compensation act and that the court was without jurisdiction. A demurrer interposed by Mills, denying the sufficiency of the answer, was overruled by the trial court, and Mills then appealed to the Court of Appeals of Kentucky.

The Kentucky workmen's compensation act defines compensable injuries as "personal injuries sustained by the employee by accident arising out of and in the course of his employment." It provides specifically "that personal injury by accident as herein defined shall not include diseases except where the disease is a natural and direct result of a traumatic injury by accident." There was no contention in this case that there was a traumatic injury. The disease from which the plaintiff suffered was caused by his taking into his stomach impure drinking water and by the absorption into his system of typhoid bacilli contained in that water. It seems manifest, said the Court of Appeals, that the injury complained of was not compensable within the meaning of the workmen's compensation act. The court below erred in overruling Mills' demurrer and thus sustaining the defendant's answer denying the jurisdiction of the trial court. The judgment of the trial court was therefore reversed and the case remanded. The plaintiff was thus left to his remedy through the courts. *Mills v. Columbia Gas Const. Co.* (Ky.), 55 S.W. (2d) 394.—*J.A.M.A.* (August, 1933).

—Pneumonia

IN AN ACTION for damages based on negligence, the plaintiff alleged that, while employed by the defendant company, he was ordered to work in a refrigerating plant which was maintained by the company. At that particular time, he alleged that he was perspiring freely and that, as a result of his work in the refrigerating plant, his clothing was frozen upon his body and he contracted pneumonia. The trial court, agreeing with the company's con-

tention, held that the petition showed exclusive jurisdiction in the workmen's compensation commission and dismissed it. An appeal to the court of appeals followed.

The compensation law defined "accident" as "an unexpected or unforeseen event happening suddenly and violently, with or without human fault, and producing at the time objective symptoms of an injury." It also defined "injury" and "personal injuries" as meaning "only violence to the physical structure of the body and such disease or infection as naturally results therefrom."

The same act provided, too, that "the said terms shall in no case be construed to include occupational disease in any form, nor shall they be construed to include any contagious or infectious disease contracted during the course of the employment."

The appellate court affirmed the judgment of the trial court, holding that the plaintiff had alleged facts upon which the workmen's compensation commission could legally find all the elements of a compensable case under the compensation law.—*Rinehart v. F. M. Stamper Co.* (Kansas City, Mo.), 55 S.W. (2d) 729; decided Dec. 12, 1932, *Public Health Report* (March, 1933).

—Lead Absorption

IN AN examination of 381 lead workers, 149 presenting a clinical picture suggestive of lead absorption and laboratory tests confirmed the diagnosis in approximately two-thirds of these. In the remaining one-third, it was considered that the symptom-complexes present were probably due to other causes. None of these workers was incapacitated. In lead absorption workers may be apparently healthy and have no complaints. Hence they present no problem because there is no disability, but they demand general prophylaxis and prevention of acute lead poisoning.

Compensation cases are those where disability is actual or claimed. In acute cases the diagnosis can usually be made with a sufficient degree of certainty. In the subacute cases the difficulties of diagnosis on the basis of the clinical picture alone are obviously very great. Thus constipation, severe headache, or abdominal pain may or may not be due to lead poisoning. The probability that lead exposure is a cause would appear to be approximately (from the above) two to one. Here careful laboratory tests are valuable and compensation may be justified. The worker very properly should be given the benefit of what slight doubt exists.

For several years the New York State Division of Industrial Hygiene has offered to make the necessary tests for physicians at cost, but for some reason physicians have not availed themselves of this offer. About two-thirds of the troublesome cases could probably be disposed of, from a compensation point of view, if the physicians would prepare their cases fully, including the necessary laboratory tests of blood and urine. —*American Journal of Public Health,* XXIII: 1087 (October, 1933).

Lead Poisoning

AN ACTION to recover damages for lead poisoning was brought by a person who had been employed by the defendant company in its storage battery factory. Judgment went against the company in the trial court and appeal was taken.

Following are certain points decided by the higher court:

Adhering to former decisions, the plaintiff's remedy was held to be an action at law and not a proceeding under the workmen's compensation act.

The admission by the trial court of evidence showing alterations to certain machinery after the plaintiff had become sick and had left the defendant's employ constituted reversible error.

An instruction that the defense of assumption of risk was not available to an employer who failed to comply with the factory act with respect to the place in which he required his employees to work stated the law correctly.

Certain requested instructions which would have advised the jury that the duty imposed by law upon the employer was merely to use reasonable and ordinary care to furnish a safe place to work did not state the law correctly where the action was brought under the factory act and where the evidence was brought within its provisions.

What was said with regard to the aforementioned requested instructions applied with equal force to certain other requested instructions which would have advised the jury that one seeking to recover damages for injuries sustained must use his own faculties and the means afforded him for his own protection and that a failure to do so barred recovery on his part.—*Hatcher v. Globe Union Mfg. Co.* (Wash.), 16 P. (2d) 824.

Workmen's Compensation

—A Complete Study of the Subject with Special Reference to its Medicolegal Aspects—

by

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X. The Result

THE RESULT, as used in the sense of this work, has a very definite meaning. It is that particular time when the accidental injury or the acquisition of an occupational disease arising out of and in the course of employment to an employee has progressed to its limit of recovery or ended in death. This is the time fixed for the estimation of compensable disability, or death, when the case should be closed for the purpose of making the award. It is, of course, open as far as the employee is concerned, until the award is determined and paid.

The minor case is comparatively simple. Injury or disease of legitimate origin is presented for treatment, which proceeds definitely to a termination of recovery. The expense incurred by reason of it is paid; the award, if any, is allowed and paid. For example a finger is caught in a machine and spontaneously amputated. The injury is cared for, the wound heals and no time is lost beyond the waiting period. The employee has suffered a loss of tissue, and this loss cannot be replaced. He has a permanent disability but it is only partial; he has lost no compensable time; he is paid for the loss of tissue.

Functional Result

SEVERAL difficulties may arise in such a case. The wound may become infected, and the time loss develop into a major case. The suffering to the injured is more discomforting and the expense is increased. The infection may extend and require amputation of the hand or arm, or it may result in death. The longer the period of convalescence, the more likely is the end result to be less satisfactory. It must be remembered that the word "result" does not refer to intermediate results. There may be a satisfactory result so far as procedure for the time being is concerned; that is, the operation may be a success but the end result may not be so good. On the other hand, a slight deformity remaining after a fracture has united, giving a good functional result, is far better than the mere apposition of bony fragments that do not unite.

I have in mind two comparative cases to serve as examples. The details are not of particular interest in this connection, only the high spots. A carpenter fell from a scaffold, sustaining a fracture of the femur. There was also a fractured skull, and arm and chest injuries. He was unconscious for several days. The injury to the femur was very severe, the bone being splintered, protruding through the skin with the complete extrusion of a triangular piece of bone. Recovery was uneventful but resulted in a slight deformity at the site of fracture and about an inch shortening. The shoe was built up and the employee became capable of resuming work within four months, which he did. But he became disgruntled, was discharged, and has spent his time since applying for compensation, a great part of which has been allowed.

The contrast case, also a carpenter with a similar type of fracture sustained in a fall, after viewing his x-ray plates and not seeing perfect apposition, left the care of his first medical attendant to consult a surgeon of renown. I mean nothing invidious for, after all, it is always a matter of judgment, but this surgeon decided that the leg should be opened and a plate inserted at once. This was about four months after the original injury, and callous was forming nicely. The attempt at healing was cast aside and the operation performed. The apposition of fragments was perfect. There was no union when the case was removed after about 15 weeks. Another operation was imperative to remove the loose plate. A cumbersome iron splint was applied, and the case sent on his way. No improvement occurred and the injured man sought relief from all sorts of cults and those practicing the limited branches of medicine. He finally returned to the surgeon who had operated and plated the bone, ready to submit to another attempt at plating. He was told that the only remaining precedure was amputation. At this juncture, after a period of two years, he came into our hands. He was thoroughly examined, splinted and treated. There is at the present writing,

a very marked bony union sufficient to support weight without a crutch. This case, however, is not one covered by compensation, but it requires no stretch of imagination to determine what the compensable cost would have been. It illustrates the fact that he would have been restored to a gainful occupation in much less time, for even now, if his recovery is complete, the result will be as much shortening as he would have had, or more, had the union a slight deformity.

Conservative Procedure

THE OPINION as to the result, depends upon who forms the opinion. The result as viewed by the industrial physician and surgeon, the injured, the relatives, the commission examiners, the referee or the commission, may be quite different. The result depends, first, upon the severity and type of injury to begin with. A badly crushed finger may be justifiably amputated or it may be repaired in the hope of preserving the tissue. With complete healing, there may be remaining an impairment of function. This impairment may be so marked as to amount to actual interference, in which event it would be better to have the member removed. The determination for removal depends upon the hopelessness or hopefulness of any improvement. The one suffering the impairment, is, of course, not in a position to know whether there is possibility of improvement. The statement is often made that if the member is to be stiff it might just as well be taken off at the time. No one can tell exactly whether it will or will not remain permanently impaired, so the best procedure is to repair and await the outcome.

Often the workman views his case with the sole question of compensation in mind. Now that he has been injured, how much will be get? "So and so" lost a finger, and he got so much. He thinks he might just as well sell the tissue and get the money for it. We have found it difficult to inform a patient, even after lengthy explanation. I have in mind a thumb case which was a severe crush, and all of the fragments could not be removed at the time of repair. Later there were sequestrae formed and the loose bone worked out. A marked restlessness became apparent on the patient's part, and without our knowledge he consulted a man with the reputation of being a bone specialist. This specialist advised and agreed to amputate, but at the suggestion, the patient got "cold feet." He returned to us, however, and in a few weeks made a beautiful recovery. In this case, the result was a good thumb. It might have been a lost thumb. So we find that the result depends upon the injury and especially the diagnosis, followed by proper treatment. The opinion of the result on the part of the patient and the doctor may be different. The doctor may interpret a good result and the patient be very much dissatisfied, especially if he entertains any ideas about the amount of compensation that is due him and the amount that he receives is much less than he expected. This small bit of psychology often makes a difference in the result, for no attempt is made to produce a result until the satisfactory amount of compensation is collected. This is a big principle and one upon which rests the explanation of a large number of delayed claims.

Complete Recovery

COMPLETE recovery takes place when the injured or occupationally sick employee is returned to a physical condition which is the same as it was before the onset of the injury or illness. Any acute condition with the scope just mentioned may be set up in an individual suffering from any other acute or chronic process. It is not reasonable therefore, to permit the industrial phase to be made a part of an already existing condition. A crushed finger may be thoroughly healed but the individual does not feel able to work because of other conditions. Yet the recovery of the injured finger is just as complete as if there were nothing else wrong and the individual had decided to take a vacation. We do not sanction such vacations and are always alert to prevent them. This attitude on our part often serves as a target for criticism.

It is sometimes interesting to note the strange attitude of some employers under such circumstances. It has been our experience that employers will say, "Well, we haven't anything to put him at right now, you better keep him off a little longer." This is, of course, wrong. It compromises the position of the industrial surgeon and has a bad moral effect on the employee. Other circumstances arise where the employer insists upon the employee remaining at work to cut down the number of reportable accidents. Neither extreme is healthy, and the entire decision should be made by the doctor; the duty of the employer is to govern himself accordingly.

Another favorite stand of the employer or some foreman is to take unto himself the authority of deciding whether or not an injured workman is able to resume work. It usually happens in this way: Convalescence having progressed to

a point where the injured workman is able to resume light work, he receives these instructions from us. He returns to his employer with this information. The foreman, without an understanding of this important step, says, "Why, you can't work with that; what's the matter with that doctor anyhow?" This, of course, stirs up a question in the mind of the employee, and, as he is accustomed to accept orders from his foreman, he assumes that the foreman is qualified to give orders along this line. Of course he cannot force himself into his work if the employer chooses to keep him out, but when this psychology is lost sight of there is no telling when the employer will be satisfied to have him back. The compensation time, however, is adding on, and the employer complains of the high premium and the doctor's continued treatment.

There is no more appropriate time than right now to show how important it is for the attending surgeon to keep in touch with his case until the injured employee is returned to capacity. No injury is without its mental phase, and being a part of the injury requires a treatment of equal skill. The treatment may be only by way of suggestion, or explanation, or both, but the value of it is inestimable. It is positively inexcusable, and the worst thing a doctor can do, to take an industrial case, look after it up to a certain point (and this arises especially in cases where a fee schedule allows only a flat fee) and then turn the patient loose. The average doctor feels that it is only a flat fee, and that he is not required to concern himself after he has what he thinks is a sufficient amount of work in proportion to the fee. These factors have such a definite bearing upon the result that they cannot be too strongly emphasized.

Kinds of Disability

THE KINDS and classifications of disabilities are not always understood. There is disability as to time loss, disability as to functional result, and disability as to loss of tissue. Suppose an injury is treated and the employee then returns to work doing the same work and earning the same wage. Practically there is no disability. Theoretically there is total disability during the period which elapses from the time of injury until it is cared for and the employee returned to his work. A very short period, it is true, but nevertheless it would not have been occasioned had the injury not happened. Now if the employee returns to his work and is not capable of performing his full duty, there is a partial disability. It may not be great, but it exists. The disability will not continue for long, and, when healing is complete or as soon as full function is resumed it will end. This period, then, is a temporary partial disability. We have thus far accounted for, in the first instance, temporary total disability and, in the second instance, temporary partial disability. These classifications include a vast majority of cases.

Consider now for example, the loss of a finger. This finger cannot be restored. The loss is permanent. Suppose no work is done for four weeks, and then, after part of the work for two weeks, a return to full capacity. By that we mean doing the same work at the same or a better wage. This workman has suffered four weeks of temporary total disability, two weeks of temporary partial disability, and, with the loss of the finger, permanent partial disability.

The permanent partial disability classifies the vast majority of cases which lose tissue, such as fingers, hands, arms, feet or legs, or lose an ear, or eye, or nose. Facial disfigurements, however, are given a rather special classification because of the change of appearance. There may be no beauty to begin with, but so far as the individual is concerned, his beauty is marred. There is one remaining classification — permanent total disability, meaning either the complete inability to resume a gainful occupation of any kind, or death which dispels all hope of ever doing anything. It is the hope still present that stirs the enthusiasm of the rehabilitationist — the ever present hope to take the injured out of the permanent total disability class and bring him back at least into the class of permanent partials. It is readily seen that there may be an award for temporary partial and permanent partial in the same individual for the same injury.

Cases which give rise to complicated adjustments are those who go to work, then lay off, then go to work for someone other than the original employer (usually at a reduced wage), or where the employee has been discharged after returning to work and decides that his injury, though actually not causing any physical discomfort, is viewed as being the cause of his discharge. And this brings us again to a difference in the result.

Occupational Disease

OCCUPATIONAL diseases will generally not result in a loss of tissue. They are usually temporary total or permanent total, but the insidious onset and protracted recovery are very

important in the consideration of these cases.

Differential diagnosis is so extremely important in these cases that careful observation cannot be too careful. I believe this field to be one of the most important for research. There is so much in the constitutional condition to account for so much in the alleged industrial condition, though the claimant will insist upon his ideas of the origin.

Trench Foot

THERE is probably no better place than right here to discuss this misnomer, "athlete's foot," as it is sometimes called. As a matter of fact, this common form of eruption is found in practically every part of the body surface. It is fundamentally a constitutional disturbance. It may be engrafted upon an injury itself. Basically, it is a death of the terminal nerve fibers that ramify between the eipthelial cells. This nerve ending death causes a bleb preparatory to nature's attempt at healing. It is true that various organisms are found within the lesions. Organisms may be found on the skin and how well we know, especially on the feet. The conditions for incubation are so admirable and satisfactory. Once the tissue is broken down and its natural immunity lowered, it is easily invaded by any of these organisms. We have observed so many cases where the infected primary lesions would be entirely cleared up, and within a comparatively short time there would appear a recurrence of the blebs which would not become infected and would respond to constitutional treatment. It is not, therefore, the actual result of injury.

Factors That Delay Recovery

THESE factors are many, but the details are purely medical subjects. I believe it is impossible to explain the important principle underlying these cases by again holding consideration to a concrete case. Injuries involving a joint are good examples, but for the purposes of discussion probably the most easily understood is a "back case."

"Back cases" are relatively common, and we have had occasion to treat a large number. Without reviewing the records, I am satisfied that there has been at least one case under observation at all times within my experience, which is almost 20 years.

Most of us who move about at all, whether we engage in strenuous or mild pursuits, have experienced muscular "stitches." The over exertion of a muscle, especially in an unusual position, will cause a pain and resulting reaction. The muscle may remain sore for several days. The back is a mass of heavy muscle groups, and involvement of any of these groups draws immediate attention because of their importance in maintaining the erect posture. Consequently muscle strains of the back are common.

Involvement of the sacroiliac joints (the site where the pelvic girdle is attached to the sacrum or lower spine) is not nearly so common, and is of a greater degree of seriousness in comparison.

The result of the back strain is recovery with reasonable promptness. One week, or some times two at the most, dispels the difficulty. However, seasonal and barometric changes seem to have a bearing upon frequency, spring and fall being more conducive to the malady. These complaints cannot always be separated from myalgias that are set up by constitutional disturbances, and a differentiation is practically impossible if a history of injury accompanies the symptoms; but, regardless, they usually clear up promptly. If they do not, it is safe to say that the cause of the trouble is to be found somewhere other than injury, except in rare cases.

The sacroiliac cases involving the joint are by far the most exasperating when complicated by hidden lesions. The average case of this type will also respond reasonably and surely to treatment in a comparatively short time when it is due to injury; but when such a case appears in the files of the commissions as a chronic invalid, unless the extreme violence of the injury warrants it, the cause is constitutional and should not be compensated.

Here is where dental work and tonsillectomies tone up the medical expense, but as has been pointed out, the extraction of bad teeth to relieve a pain in the back which they have caused should not be charged against industry. The same is true of tonsils. It is also a fact, that delayed recovery is more often found in cases past middle life than before middle life.

These are examples of results that are attributed to injury, when actually the result is that of an entirely different cause.

The Loafing Habit

IT IS USELESS to attempt a denial that any such thing as a "loafing habit" exists. It is a form of conduct, or misconduct if you please, and is just as apt to be a factor in the result of injury as any other. We have found that those who have been very steady and reliable work-

men have acquired the working habit. They acquire the loafing habit quite as easily after they have remained off from work a certain length of time. This period differs, of course, but once it has elapsed, it is equally as certain.

The loafing habit is primarily a mental condition. It is the least, however, of the mental condition offenders. I have already mentioned that a mental phase accompanies all disabilities. It may be of minor importance, or it may be serious. Exaggeration, hypochondriasis, neurasthenia, or even plain malingering, may be present, but these again are seldom the result of injury; they are basically present at the time of the injury, and industry should not be charged with them. It is obvious that these details in any case should be carefully checked and taken into consideration when the final award is made. The information is best obtained from the industrial physician and surgeon, for he is ever on the alert to appraise a case from these angles. This is an important part of his industrial-mindedness.

Order From Chaos

The Use of Scientific Methods in Prevention, Control, and Defense of Silicosis Cases

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FEAR is said to be the greatest enemy of mankind, and fear of the unknown the greatest of all fears. If we analyze psychologically what is behind fear we find that various steps of feeling and thinking and attitudes have led up to a result which is called fear: we find for instance, loss of confidence, doubts, misconceptions, and finally, the individual is in a state where he does not believe anybody and where his ideas are confused. Briefly stated, this is a birds-eye view of the feelings and attitudes through which many persons have passed in regard to the silicosis problem. Many have found themselves in the same state of mind as well expressed by one of Robert Browning's characters in the following words: "Now who shall arbitrate—ten men love what I hate—ten who in ears and eyes—match me, we all surmise—they this thing and I that—whom shall my soul believe?"

Browning makes use of the word "surmise." There has been altogether too much surmise regarding the many phases of the silicosis problem. We have taken too much for granted and have not depended upon scientific knowledge. It is the purpose here to get on solid ground, and to suggest the use of scientific methods in the working out of the many difficult things which have occurred in relation to silicosis.

There has been much discussion as to the relative value of scientific methods in this type of work and also in regard to the relative age of these methods. When I think of dust analysis methods, my memory goes back to 10 years ago when I was associated with Professor Philip Drinker, at Harvard, where we made use of the then available methods for dust analysis and used them in laboratory work and in plant surveys. There has been some improvement since then: for instance, in 1922 the impinger was devised and a report was made upon the use of this instrument in collecting dust; in 1925 the relative merits of various types of dust collecting instruments, such as the sugar tube, the konimeter, and the Owens' jet dust counter, were compared with the impinger as to relative efficiency and the results published. During the intervening years a number of important dust surveys and studies have been made and the results also published.

It should be emphasized that scientific information regarding the quantity and quality of dust and chemical exposures in industry is not obtainable by mere inspection alone. A hygienic survey of plant conditions should first be made, consisting of a survey proper and an occupational analysis. This information should show kinds of machines or processes which are producing dust or toxic emanations, the nature of equipment used to control these conditions, and the type of work done by the men who are exposed. Knowing these things, it is then possible to decide when and where physical and chemical determinations regarding the quantity and quality of fumes and dusts should be made. Knowing the minimum amount of materials to which an employee may be exposed without harm, or at least the amount to which good industrial practice can keep them, we are then able definitely to determine where and what the hazard is.

In these days there are a number of incentives to employers to know exactly what working conditions are in terms of scientific results. The wider knowledge of the effects of industrial environment on health and efficiency, the establishment of specific codes in some states in an attempt to prevent the occupational diseases and the growing tendency to compensate for occupational diseases have all provided a stimulus for industry to eliminate them. These factors have

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* From a talk given before the Engineering Division of the Chicago Safety Council, December 21, 1933.

aroused an interest in working conditions and a desire on the part of industry to know whether potentially hazardous processes or materials are being used, or whether working environment provided is affecting the health of individuals in the employ of the companies concerned.

Two years ago in connection with dust as an industrial hazard, I pointed out four important factors and their relationships in the industrial environment, which have a distinct bearing on the contracting of silicosis. They are still of considerable value and probably will be so for many years to come. Whether or not any given individual contracts silicosis depends upon the following factors: (1) the amount of dust in the breathing atmosphere—this has reference to concentration; (2) the percentage of quartz contained in the aerial dust—this has reference to the mineralogical composition of the dust; (3) the size of dust particles—it is well known that particles beyond a certain size do not penetrate the air sacs of the lungs; and (4) the period of exposure measured in terms of years.

Certain standards of dustiness have been established by the studies undertaken by the United States Public Health Service. In the survey made by the U. S. Public Health Service on Barre, Vermont, granite cutters, published in 1929, the following standards resulted: with approximately 35% quartz in the dust, the dust particles measuring under 10 microns in greatest diameter, and with a concentration over 20 million particles of dust per cubic foot of air, silicosis developed and latent tuberculosis was reactivated in a varying period of years, in different individuals. It was found with this same percentage of quartz and the same particle size of dust that when the concentration fell under 10 million particles of dust per cubic foot of air the conditions were considered safe.

The real value of the so-called "dust count" has been a source of confusion. First, a dust count of and by itself is of no more significance in the estimation of a health hazard in a dusty process than is a blood count or urinalysis alone in making a medical diagnosis. In connection with the four factors which have to be taken into consideration when estimating a relative silicosis hazard in any given industrial environment; the so-called "dust count" refers merely to the concentration of the dust and does not give any information relative to the mineralogical composition, nor yield any knowledge concerning the exposure of various individuals. Even when all of these factors are known, they must be properly interpreted and applied to each set of conditions found in any given plant; they must be coupled with a hygienic plant survey which includes an occupational analysis of all exposed employees, and also an assessment of the efficiency of the dust removal and protective devices used. When this combination is possible, the use of these methods is of considerable value. In short, a dust study and survey of a plant will yield information regarding the severity of the health hazard and the efficiency of control devices. This information may be used in two ways: to prove that a health hazard does not exist, or when it does, to indicate measures of control. It is plain, therefore, that there are good reasons for abolishing the term "dust count," and substituting in its place the term "dust analyses," or "dust study," or "dust survey."

It should be well understood, however, that the technique of dust sampling and dust analysis has been recorded in the literature, and that there is also an approved technique sponsored by the U. S. Public Health Service. It is well that this is so, for we need a national standard, so that comparisons may be made by various investigators, and so that there may be also a basis for comparison for different plants.

I have previously said and written a great deal about the importance of industrial health hazards to insurance carriers. This is also important to industrial plants, for until some definite economic plan is offered for the underwriting of occupational disease risks, the necessity for paying these obligations will lie either with the insurance companies which accept such business or with the larger corporations which are able to carry their own insurance. In either event, a serious consideration of the problem, which is itself serious at present, calls for a critical analysis of the underlying principles involved. What I have to say applies equally well to other occupational disease hazards besides that of silicosis.

Briefly, the following points are of considerable importance: (1) a knowledge of the materials and processes used; (2) an estimation of the possible harmful effects upon exposed employees, in terms of quantity and quality; (3) an assessment of the efficiency of protective apparatus and devices; and (4) a rating of the hazard in terms of underwriting the risk. A brief discussion of these essentials may be in order: it must be obvious that one cannot estimate what type of health hazard is present in any given industry without a definite knowledge of the processes and materials used in the manufacture of

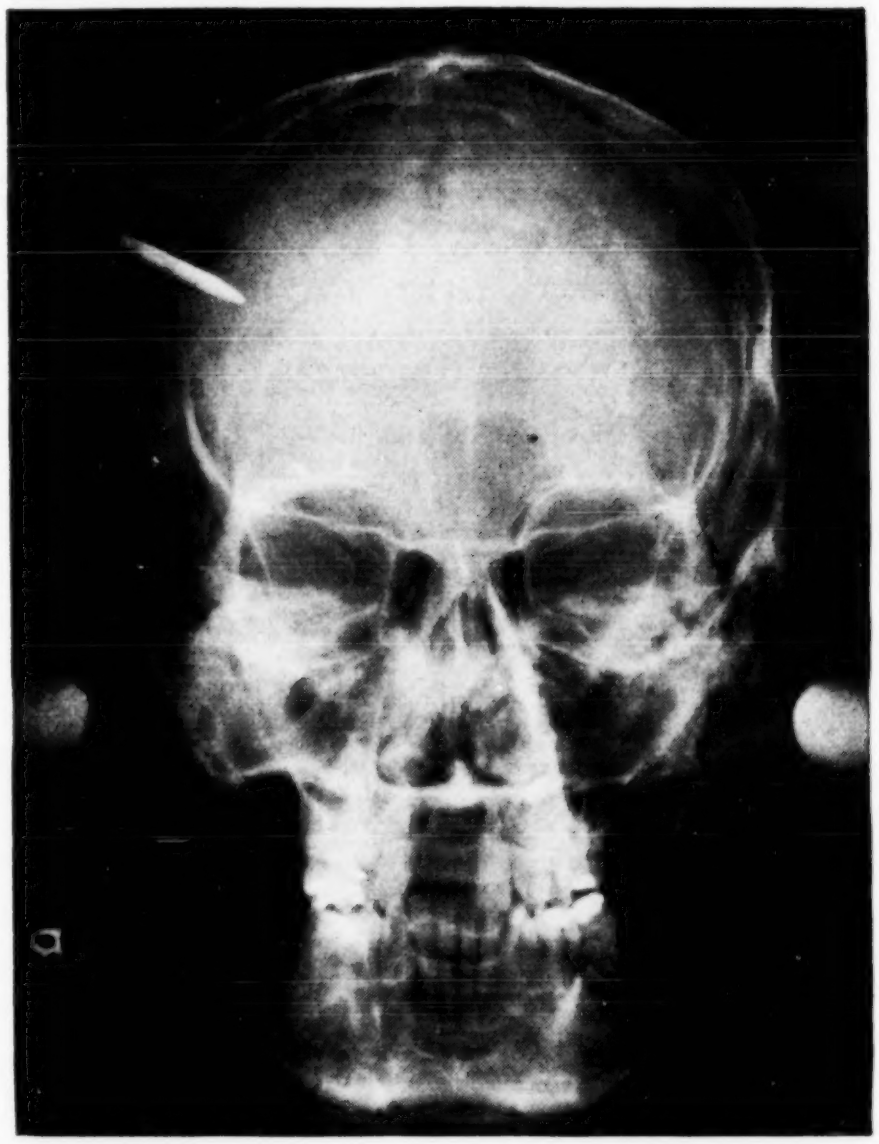
various products; after knowing what the processes and materials are, the next step is to interpret the possible harmful effects upon exposed employees, after knowing the quantity of the materials used and their quality—in other words, a practical application of industrial toxicology; it is equally important to know what protection is provided and the efficiency of that protection —this knowledge can be gained through the quantitative estimation of amounts of deleterious substances in the working environment. Finally, when all of this knowledge and information is assembled, and compared with standards which have been set down previously for healthful working conditions, it should be possible to rate the health hazard in underwriting terms.

Surely something should be said about the preventive aspects of occupational diseases, for it costs many times over to defend one case at law, what it would cost over a period of years properly to protect employees and prevent the occurrence of an occupational disease. Prevention is basic for progress, and the progressive industries now and in the future will avail themselves of preventive methods, for they will discover the difference not only in economic cost, but also in terms of lessened absenteeism, labor turnover, inefficiency, spoilage, and other factors which are so intangibly represented by a dollars-and-cents point of view. Furthermore, the relative value of knowing qualitatively and quantitatively what degree of health hazard there is in any given industrial environment is greatly enhanced by having such information before differences of opinion as to what constitutes a hazard arise.

Concerning the apparent despair and discouragement in the minds of a number of persons who have had troubles either with silicosis or alleged silicosis, it is not stretching the truth to say that it is just as presumptive to believe that you can do nothing as it is that you can do everything. Surely there is a middle ground where one can profitably use the collective intelligence available and accomplish much more than by the presumptiveness of the extremes mentioned.

One for the Medical Department

EASTMAN KODAK employee James P. Sherry, age 34, suffering from severe headaches and increasing lameness in one leg, consulted Dr. Charles S. Gallaher, of the company's Medical Department at Kodak Park, Rochester. Dr. Gallaher, finding an additional symptom in an abnormal condition of the eye opposite to the lame leg, diagnosed the trouble as an affection of the brain; feared the possibility of an abscess; ordered an x-ray examination. The result was the radiograph shown here; and an examination of the scalp thereupon revealed a fine scar. A second radiograph, from another angle, showed the doctors that the foreign body was not a bullet, as might otherwise have been thought. Mr. Sherry didn't remember that he had ever sustained a head injury, especially such as might account for his symptoms. But Dr. Ward Williams, after consultation with Dr. Gallaher and Dr. Arthur P. Reed, representative of the Veterans Bureau in Rochester, operated, on January 5, and removed the blade of a pocket knife from his brain.



Fifteen Years Without Knowing It Was There

The only explanation the doctors and Mr. Sherry can arrive at has to do with shrapnel in the Argonne. Mr. Sherry was struck on the elbow by shrapnel, and for hours afterward was dazed. It is believed that the knife blade was in the same shell, and was driven through the skull by the same burst. Probably it went in red hot and cauterized the wound it had made. No other explanation seems plausible. In any case, Mr. Sherry harbored the blade for more than 15 years without knowing it. The piece of steel was very rusty when it was taken out; fibrous tissue had formed around it.

Worriers

—*Why Some Men Worry So Much, And What May Be Done About It*—

by

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WORRIERS are semi-sick and therefore semi-efficient. Sickness of all sorts is the realm of the physician. Sickness including worry of industrial workers is within the purview of industrial medicine.

Worry, by definition, is a type of phantasy or revery, where the mood is depressed or anxious and not pleasant, and where the time is the present or immediate future rather than the distant future. In these two ways it differs from the ordinary, or anticipatory, phantasy or revery. The other characteristics of worry and of wistful thinking are alike: The thoughts are highly emotional, personal or of ego-concern, full of inconsistencies, vague and shadowy and not clear cut, so extreme as to sound absurd if told to another (hence usually kept to one's self), often highly improbable, momentary or brief or protracted, i. e., occurring uniquely but once, or maybe returning, and returning with modifications, and usually coming to mind when the hands are not occupied and engaging the mind, namely when abed, oftener between awakening and arising, or when somewhat sick or convalescing, when traveling, or even when "alone in a crowd."

They take one's mind off the work at hand, and although one may look at his work before him with his actual eyes, one's "mind's eye" is elsewhere. Thus one is predisposed toward inefficiency, failure, inaccuracy, and even accident.

Anticipatory reveries, if expressed aloud, would begin with "If," or "When," or "I wish . . ." It must be realized that a fear is a negative wish; for example, if I say "I wish to be rich," or if I say "I fear to be poor" I am expressing the same idea—in the one instance expressing it in positive terms and in the other expressing it in negative terms. So, worries, if expressed aloud, would begin with "If . . .", or "When . . .", or "I fear . . ." (or "I wish not . . .").

Suppose some worker on the night shift is worrying about his wife's suspected infidelity. He would say to himself: "If I catch Joe hanging around . . .", or, "When I get home . . .", or, "I wish she'd behave herself," (or "I wish she'd not misbehave . . ."), "always nuts about dancing and me working like hell for her—just because the baby died—drinking—home like an icebox—damn Joe—worse than his sister—and she scared me when she said I got her into trouble—wonder who'll make trouble for me next—it's all so lonesome—but it's one damn thing after another—and now the wife lets me down—what's the use of living?—things are getting worse and worse—there's the foreman and I wonder if he saw that I parked the old bus by a fire plug in the factory yard—'What? the Old Man wants to see me? . . .' Oh my God, now what have I done? (or left undone?)—Jees, if I get laid off—and Joe working—she'll leave me."

Endless. Sickening. Semiparalyzing. Worry may be fatal: suicide is fatal.

WORRY *is* sickening. It causes or increases vagotonia. Blood pressure falls, blood sugar is diminished, sub-thyroidism, sub-adrenalism, sub-gonadism, and sub-cerebration all ensue. Resistance to microbic infection is lowered. Feelings of fatigue and asthenia develop. Visual acuity, especially peripheral vision diminish. Anorexia and indigestion and constipation, ptosis, chronic passive congestion and loss of weight may, and usually do, follow. Myasthenia, lassitude of muscles and muscular weakness, even myocarditis, with resulting lack of hygiene and exercise are complications of chronic worry.

When worry is aggravated by non-reactivity on the part of the individual, then he gets self-disgusted. Maybe he is so overly civilized that he does not *fight* his way out of his troubles. Then he hates himself, too. When he is at war with himself, when he is churned by internal mental conflict with himself, then there can be no end, no peace. When there is ceaseless activity of any part of the body, there develops a state of fatigue; if the nervous system (including the mind) is involved, there develops the condition known as neurasthenia with its symptoms of hyper-irritability and fatigue. Then if the neurasthenia becomes chronic, hypochondriasis de-

velops. [Editor's note: Hypo — under, chondrium—rib. The old Greeks called the condition of complaining, of the stomach etc. what the modern man of the street calls "belly-aching."]

Impotence of course develops and this increases the melancholia and dejection; these lead to feelings of pre-senility, and death seems both inevitable and maybe preferable. Indifference to others and to social or cultural demands follows. Ambition and pride disappear. Doubts, indecisions and inability to "make up one's mind" develop as distressing and further aggravating symptoms.

WHAT can be done with it? Worry is an emotion. Emotions should motivate physical activity. The rule is, when emotional, do something about it, something motor, something physical, preferably with the hands. Or else dismiss from the mind the train of emotional thought. True, reacting to emotions is often socially abrupt and awkward. What of it? A black eye received or given is better than worry and nervous symptoms, isn't it? And it is much more in accordance with nature's rule that one must struggle or perish in the struggle for existence.

One seldom worries unless he feels lonesome and deserted. Worry over money or lack of money does not of itself cause sickness. The human race has met war and panic and disaster so often that we are adequately inured to them. Each of them is a bearable burden. But trouble plus desertion is too much to bear. The most painful desertion is when the love of the heart and the companionship of the mind and normal sex relationship are all lost together, namely when the wife is deserting. Her deserting is worse than her death would have been. His thoughts lead inevitably inward toward contemplating death, his death not hers.

If men would stop spoiling their personalities by selfishness and indulgence, fewer women would desert them. If men would stop spoiling their wives by indulging them and stop teaching them selfishness (disguised as adoration), and if men and women would live together fully and naturally and stop trying to evade nature by attempting silly birth control, then there would be fewer desertions, fewer quasi-desertings, less worrying and better health.

It is, therefore, obvious that whatever outsiders, leaders in business and industry or society, can do to encourage normality and wholesomeness in living is helpful to others.

It is smart and proper for the company physician to say to a workman who appears to be worried: "How's your fighting spirit these days, Old Man? Lots of troubles, eh? Well, sic 'em or they'll sicken you. How's your family? And that fine big boy of yours—a swell kid. Heard your daughter won a prize at school. Keeps your wife busy? Pshaw! Any good woman can take care of four children at once. The world needs and welcomes children like yours and Molly's. She's a fine mother. Tell her so. She's no cripple nor ancient. Tell her to keep on being a fine mother and she'll be a finer woman. And, Old Son, you behave yourself and stop making mistakes, stop doing things which you or Molly either one thinks are wrong. You'll get back your fighting spirit that way. Fundamentally you are sound. Natural home life will be good for everybody."

Persons who have a tendency to worry should safeguard their physical health. Health is not to be found indoors. Health means outdoors, about two to three hours a day, except in windy weather.

Worriers need mental health too. One of the best ways to stop repetitive worrying is to permit one's self to find and engage in some outside activity like a hobby. No matter what it is, it must have certain characteristics: the individual must pick it out for himself, it must not be selected by someone else; it must be something that is constructive and creative, not maintenance and repair; it must be something which permits the individual to do part of the planning and also permits him actually to engage himself in carrying out his plans. The hobby must be one which permits him to use his hands as well as his mind in carrying out his plans. The self-assigned task must be short enough, or its parts short enough, so that upon completion the individual may say to himself, "I am good for something, I can start something and finish it." The activity must be something which leads to a visible result. It must be something of which the individual is not ashamed: this does not mean that it must be something about which he is necessarily proud, for it may be something unimportant, or it may be something done just for fun because it interests him. New hobbies grow out of old ones, if the individual permits himself to be open-minded.

Normal people take up a new hobby about every two and one-half years.

The hobbies which are most healthening to body and mind are those which are out-of-door

hobbies. They are wholesome—they keep one young, they increase mental zest, and they give one endurance.

Health Insurance

THE THEORIES of health insurance are most alluring. The difficulties encountered when attempts are made to apply these theories to medico-social problems make men hesitate to subscribe to them. Observing various physicians studying the problems of health insurance one is reminded of the story of the highbrow music critic who was asked to report a recital of modern music for his newspaper. At first hostile, he gradually relaxed to the danger point. Finally, he leaped to his feet, shouting, "Let me out of here before I begin to like the damned stuff." Regardless of our opinions for or against health insurance, the widespread interest which has been manifested in it seems to me to demand a statement from organized medicine in order that certain essential relationships between the physician and the public may be preserved. This statement should not be a commitment to the principles of health insurance. Following the example of the British Columbia Medical Association, we should set forth the principles to be followed if and when health insurance comes.—S. J. Seeger, *in Wisconsin Medical Journal*, (October, 1933).

Significances and Coincidences

DR. WILLIAM H. SPEER, in his Presidential address "The Future of the Medical Profession in the Next 25 Years," read before the Medical Society of Delaware some months ago, said, in part: "From the industrial standpoint, there are many fewer accidents today because of the safety devices and programs used and put in force by the manufacturer. The radio and newspaper have a great deal to do with the patients not seeking medical advice because they make their own diagnosis and treat themselves accordingly. How dangerous this is! In doing it they often lose valuable time which may mean death. As an example, take an early malignancy of the cervix. A person instead of seeking professional advice will try douches and 'Lydia Pinkham's' or some other such advertised medicine, until the condition has reached a point where surgical interference is of no avail."

Isn't it true! Dr. W. A. Evans, in his "How To Keep Well," copyrighted column in *Chicago Tribune*, said recently: "A study of the use of drugs has shown that the people do more prescribing than the physician. Of every 100 pounds of drugs sold for human use far less than 50 pounds is prescribed by physicians. Far more than that is bought by the people themselves and taken on their own responsibility."

Education in respect of the evils of self-doctoring *is*, indeed, having a difficult time, the urge toward nostrums being so adroitly played upon, ad wearium and ad nauseum, by radio and printed word. And in that respect Dr. Speer was eminently *right*.

BUT Dr. Speer continues: "Another condition which detracts from the general practice is the employment of physicians by companies to take care of their employees. I do not refer to the contract man of the mines, but to conditions such as we have in Wilmington. A person has a minor disorder and instead of going to a physician who has made himself capable of taking care of the sick, he or she can go to the company doctor and receive free treatment. To my mind this is absolutely unfair competition on the part of the company with the medical profession. It is even more unfair when the company physician advises that person to seek outside medical or surgical advice by referring him somewhere, when if left to choose for himself he would have his own physician, but being under the impression that he must do as advised, his own physician loses the case. * * * The companies employing physicians claim that they are not doing anything unethical but are rendering a service to their employees, and they do not consider the family physician in any way. In fact, there is a feeling among a lot of executives of certain companies that the rank and file of the physicians is not competent to practice medicine. On what authority they base their opinion I do not know, but it means that some legislation will have to be devised to combat this abominable condition."

In this respect, however, we cannot concede that Dr. Speer is as right as he was in the other. Industrial medicine is a distinct and recognized specialty, offering far greater advantages to employees than a considerable percentage of physicians and surgeons have, in the past, been willing to concede,—not to mention its numerous and important advantages to employers. Furthermore, it is the keystone of preventive medicine, and as such it gives physicians and surgeons unlimited opportunities otherwise not possible.

Our Problem Page

—*VII. Carbon Monoxide Poisoning*—

THIS is the seventh of a series of articles in which important problems of industrial medicine and hygiene will be discussed. In the form to be used, the problem in its essentials will be briefly stated, and the discussion will follow. Suggestions from readers will be welcomed and given due consideration in the selection of future subjects.

PROBLEM: Is it true that carbon monoxide poisoning produces anemia? In addition to answering this question, please give information relative to the occurrence of carbon monoxide gas, its chemical properties, the amount which produces injurious results, means of identifying the gas in air samples, symptoms of poisoning, and treatment.

DISCUSSION: The word anemia is usually used to indicate a condition of the blood in which both the number of red blood corpuscles and the coloring matter or hemoglobin have been decreased below the normal. Haines, Karasek and Apfelbach, in investigations of the effects of carbon monoxide, found that workmen exposed frequently to gas of this type in a large majority of cases developed a considerable increase of red blood corpuscles above the normal, the number in one case examined reaching nine million. The amount of hemoglobin was also usually above normal. These changes were interpreted as a protective effort on the part of the human body to provide further oxygen-carrying power to the blood as a compensation for the red cells which were out of commission, so to speak, because of their combination with carbon monoxide.

The *occurrence* of carbon monoxide gas is quite general; it has been stated that it is probably the most widespread poison connected with human life and activity. Usually carbon monoxide is formed as the result of incomplete combustion of carbonaceous material, but it is also a frequent by-product of the combustion of compounds containing carbon. Anything which may interfere with complete combustion, therefore, may produce carbon monoxide gas, as when a flame strikes a cooling surface such as a metallic plate or water coil.

The largest number of industrial cases of carbon monoxide poisoning occur from exposure to producer gas and blast furnace gas. Other frequent sources of carbon monoxide are boilers and mines. Perhaps the most frequent non-industrial, as well as industrial, source of carbon monoxide gas within recent years is the automobile. Kober and Hayhurst have listed 26 possible sources of industrial contact in various types of manufacturing.

The *chemical properties* of carbon monoxide gas are as follows: it is a colorless, tasteless, odorless and non-irritating gas; it burns with a blue flame at 1100 degrees F. but does not maintain combustion. It is explosive when occurring in 15 to 73% in air mixtures. The specific gravity of the gas is 0.967, hence it mixes readily with air and has little stability like heavier or lighter gases. Although very diffusible, the gas is readily rendered inert by dust and oils.

Carbon monoxide gas is easily taken up by ammonia compounds, or by hydrochloric acid solutions ofcuprous chloride.

In its action within the human body, carbon monoxide displaces oxygen from the coloring matter of the red blood corpuscles (hemoglobin) forming an unstable compound with the hemoglobin which is called carbon-monoxide-hemoglobin. It is well to keep in mind that this is merely a displacement and fortunately the compound is an unstable one, otherwise persons could not be revived; the red cells of the blood in which the hemoglobin has taken up carbon monoxide are not injured by this process; when by resuscitation methods, oxygen has been made to displace the carbon monoxide from the hemoglobin, the red cells are still capable of transporting oxygen through the blood stream. This function, however, cannot be carried out as long as carbon monoxide continues in combination with the hemoglobin.

Carbon monoxide, except for this one reaction, is a physiologically inert gas. It has been classified by Henderson and Haggard as a chemical asphyxiant, for this reason. Chemically, carbon monoxide has about three hundred times greater attraction for hemoglobin than oxygen. It is because of this affinity, that oxygen is administered to persons who have been overcome by carbon monoxide gas.

The *amount which is injurious* will vary under different circumstances. Henderson and Haggard have worked out the physiological re-

sponse to various concentrations of carbon monoxide as follows: concentration allowable for an exposure of several hours, 100; concentration which can be inhaled for one hour without appreciable effort, 400 to 500; concentration causing a just appreciable effect after one hour exposure, 600 to 700; concentration causing unpleasant but not dangerous symptoms after one hour exposure, 1000 to 1200; dangerous concentration for exposure of one hour, 1500 to 2000; concentrations which are fatal in exposures of less than one hour, 4000 and above. (These values are given in terms of parts of carbon monoxide per million parts of air).

The *methods of identification* of carbon monoxide in air are several. Perhaps the most simple device is what is known as the Burrell Detector; the instrument is composed of a small metal barrel with a rubber bulb at one end; a glass tube containing a detecting substance known as "hoolamite" (fuming sulphuric acid, iodine pentoxide and powdered pumice) can be inserted into the apparatus. This substance changes color from light gray to a green when air is contaminated by carbon monoxide. An accompanying calibrated color scale permits the estimation in a few seconds of amounts of carbon monoxide varying from 0.05 to 1.0%. The instrument is very sensitive and can be used practically in any gaseous zone.

A more efficient method, however, has been recently developed, by the use of a portable continuous carbon monoxide indicator. This instrument operates on the principle which has been successfully employed in the larger stationary indicators installed in the Holland Tunnels. Air is drawn through the apparatus at the rate of 4.5 liters a minute by a small motor-driven pump, the pump operating on a six volt storage battery, or on alternating current reduced to the proper voltage. The air first passes through a canister which removes interfering materials, then goes through a cell containing hopcalite. The cold junction of a thermopile is surrounded with de-energized hopcalite and the hot junction with active hopcalite; here the carbon monoxide is quantitatively oxidized under the influence of the catalyst and the amount of heat produced measured by the deflection of a galvanometer. The apparatus is calibrated to read directly in parts of carbon monoxide per ten thousand parts of air. The entire scale division represents 15 parts per ten thousand. It requires only 20 to 30 seconds for this instrument to register the concentration of carbon monoxide in the air being tested, thus permitting the possibility of a large number of observations within a limited time.

The symptoms of carbon monoxide poisoning ordinarily depend upon the extent of the combination of the gas with the hemoglobin of the blood.

The most typical symptom is severe frontal headache, which is usually characteristic and is the first symptom experienced by a person under the influence of the gas.

Some authorities question whether there is such a thing as chronic carbon monoxide poisoning, but those who maintain that there is such a condition, state that the chronic type produces frequent headaches, dizziness, nausea, vomiting, weakness of the memory, coated tongue, palpitation of the heart, insomnia, general debility, and slow mental reactions. In the acute type there is a feeling of pressure in the region of the temples, ringing of the ears, severe headache; gastric distress, accompanied by nausea and sometimes vomiting; fluttering of the heart; sensations of chilliness; weakness of the legs with sluggishness of movement; hallucinations and other severe mental symptoms; and occasionally convulsions; and blurring of the vision.

Apparently there are great differences in individual reactions, because there is evidently some tolerance developed on the part of persons who are exposed continuously.

Pneumonia is the most serious complication of carbon monoxide gassing, although paralysis and other nervous and mental conditions have followed severe exposures.

The *treatment* consists first in getting the patient immediately into the fresh air and beginning the prone pressure method of artificial respiration without delay. It is advisable to use in conjunction with artificial respiration, an approved type of inhalator which will furnish a mixture of 93% oxygen and 7% carbon dioxide. Supportive measures such as aiding of the circulation by rubbing the arms and legs and keeping the body warm with blankets—the use of hot water bottles or hot bricks—may also be used, care being taken not to burn the patient in their use.

The patient should be kept at rest, lying down in order to avoid strain on the heart, and should be given plenty of time to rest and recuperate properly.

It should also be stated that drugs have little, if any, value in the treatment of this type of asphyxia.

Sickness and the Depression

THE measurement of the effect of the economic depression upon sickness has been the cause of a great deal of speculation among physicians, statisticians and others.

Perrott, Collins, and Sydenstricker* have issued a preliminary report on illness in families of wage earners in Birmingham, Detroit, and Pittsburgh. The findings for this study were based upon illness records for 1933, the economic history of 12,000 families in eight large cities for 1929 and 1932, a group of coal-mining communities, and a group of cotton-mill villages.

The preliminary report covers a group of 2,566 families and included 11,330 individuals.

The report says: "The indices of health, or rather of ill health, upon which we ordinarily rely have pointed so far to a condition that is surprising to many. After several years of severe economic stress, the gross death rate has attained the lowest level on record. Infant and tuberculosis mortality have not increased in the country as a whole; on the contrary, they have continued to decline. These encouraging indications have led to considerable speculation on the part of some as to the possible advantage of 'tightening the belt' during hard times, of returning to 'simpler and saner living,' of the 'toughening' regimen of adversity. Others have offered the explanation that any ill effects have been prevented by a marvelously efficient public health system and program of social relief, and are concerned chiefly over the possibility of a breakdown in these efforts before necessary economic readjustments can be completed.

"Whatever may be the reasons for a low death rate during an unusually severe economic depression, the fact that the death rate has continued on a low level must be accepted as a most encouraging sign. It is indubitable evidence that, up to this time, unemployment, diminished purchasing power, altered standards of living, and even privation have not *killed* very many of the population. But this indication should be accepted only in so far as it really is a sign of good health. The death rate is not an adequate criterion of the extent of sickness and impairment. It is not affected immediately by unfavorable living conditions unless starvation and pestilence are actually present. It does not promptly reveal decreased resistance to disease. It is not an accurate measure, for example, of malnutrition. Furthermore, the gross mortality rate for the nation as a whole or for any large group of the population does not tell whether or not certain elements of the population are suffering from ill health; the actual increase in illness and mortality among that fraction which has been reduced to poverty by the depression may be masked by the general downward trend of the mortality among the more fortunate and larger moiety of the population. In fact, fragmentary information already gives a hint of warning that, in certain areas and among certain classes of the population, the situation is not nearly so favorable as gross mortality rates appear to show. Malnutrition among school children apparently has increased, in some localities at least. Higher infant mortality and tuberculosis death rates have been experienced in certain areas of New York city where unemployment was most serious. Signs of an increase in the number of cases of mental disease are not lacking. Already there is some evidence that the sickness rate has risen among the unemployed population, especially where social relief has been unequal to the situation."

The results of this study show a higher incidence of disabling illness among individuals in the lower-income classes in 1932 than among individuals with higher incomes. The highest illness rate is reported by a group which was in reasonably comfortable circumstances in 1929 but which had dropped to comparative poverty by 1932; their rate is 60% higher than that of their more fortunate neighbors who were equal in economic status in 1929 but suffered no drop in income by 1932. The group of individuals who may be described as the "chronically poor," that is, individuals who were in a condition of poverty even in 1929, showed a relatively low sickness rate as compared with the group which had fallen into straightened circumstances as a result of the economic depression. The rate of disabling illness reported among individuals from families of the unemployed was 39% higher than that of the group having full time wage earners and 25% higher than that of the group containing part time but no full time workers.

It is apparent in this preliminary report that the rate of disabling illness is considerbly higher among families of the unemployed than among those having even part time workers. This is of considerable significance to industrial physicians and may allow at least a tentative conclusion that employed persons suffer considerably less (even on a part time basis) from the ordinary disabling diseases than do the unemployed.

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* Perrott, G. St. J., Collins, Selwyn D., and Sydenstricker, Edgar: Sickness and the Economic Depression. *U.S.P.H.S. Public Health Reports* 48:1251-1264, October 13, 1933.

Industrial Medicine

Reg. U. S. Pat. Off.

Published Monthly by
INDUSTRIAL MEDICINE, INC.
For the Physician and Surgeon in Industry

Publication Offices
413 Pleasant Street, Beloit, Wis.

Editorial Offices
844 Rush Street, Chicago, Ill.

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VOLUME 3 MARCH, 1934 NUMBER 3

"THE MEDICAL *department of an industry is, almost without exception, an index of the economic value the management places upon health service rather than what the medical officer desires it to be. If better medical service is desired in industry it is not so much a problem of the* physician *in industry as it is of the educating of the* management *to the value of such a service. Many large industries have already proved that the more extensive the health service rendered the better it pays.*"—Dr. Volney S. Cheney.

EDITORIAL

Medical Records—an Unusual Opportunity

IT IS NOT often that the medical forms and practices of utilities and other organizations can be made available to industry generally, because of the policy of conservative silence permeating most large industrial groups.

But next month's (April's) issue of *Industrial Medicine* is one of the rare occasions when they can; a *complete* group of medical department forms, evolved from experience, will be presented in its pages, with working instructions and comments. They comprise Sec. VII of Dr. Hart E. Fisher's "Medical Department Manual," Secs. IV, V, VI and VII of which begin on P. 150.

As Dr. Fisher says: "We have a complete, written record of all that happens in the daily work of our department. We have on file every record and letter since the inauguration of the department. It may not be needed today, but it may be of inestimable value tomorrow. One of the compliments given to our department is that if any information is wanted regarding the health and welfare of our employees, it can be obtained at once in the Medical Department. No greater compliment can be paid to an organization conducted by physicians who are alert to incorporate the methods of the general business world in their medical practice."

This principle—of utmost care in records—has it legal applications, and these are rapidly becoming more important. The keeping of proper records *must*, in industry as nowhere else, be thorough and systematic — because, for one strong reason, the *fact of employment* makes of practically every contact between employee and medical department a potential lawsuit. The contacts may involve anything from a foreign body in the eye to a death, and there may be as many records passing across the chief surgeon's desk as will keep track of 40,000 such contacts in a single year, and yet no one of them is so trivial but what it *may* have the end result of costing the company something more than the expense of its care. By the use of such a system as Dr. Fisher's it is possible to trace the medical history of any given employee through his entire employment period and present the facts as evidence in disputed claims or in court actions. This not only saves time, worry, and money, but also frequently expedites legal decisions, as well as having a decided persuasiveness to fairness in the same.

Of special importance is the procedure used when the employee certifies to the correctness and truth of his statements by applying his signature to the examination form upon its completion. This importance will inevitably be accentuated under any form of the so-called "unemployment insurance."

In the development of forms for use in periodic examinations and for specialists' examinations, it is important that the material be so arranged that the examining physician can check the pertinent items, thus saving time. This arrangement of questions and other statements must be carefully done, however, avoiding confusion and still indicating that nothing of value has been omitted. Dr. Fisher has covered this vital point unusually well. The use of a compre-

hensive record system allows the preparation of weekly, monthly, quarterly, and annual recapitulations, which are of considerable value in checking progress and when anticipating modifications of service. But not the least valuable results accrue from the economical use of time, and a regular and business-like system of accounting relative to supplies.

In addition to all this a real disclosure of the value of employee medical records lies in their use in making comparisons with other similar groups, to establish whether a given experience has been average, below average, or above. Since records are so necessary they should be used to their fullest possibilities; they should be more than merely precautionary. Comparisons are highly instructive, and nowhere is there such great need for the pooling of experience upon which to base future revisions as in industrial medical and surgical practice.

Minor Respiratory Attacks

AS HAS previously been mentioned in these columns, attacks of respiratory disease, particularly the common cold and other similar affections, account for more than one-third of the sickness absenteeism experienced by typical industrial establishments.

Collins and Gover* have recently studied the incidence and clinical symptoms of these attacks with special reference to variations according to age, sex, and season of the year.

In this study the information was obtained from a group of families of medical officers of the United States Army, Navy and Public Health Service and the faculty members of certain universities for a period of 33 months consecutively; for a shorter period reports were received from a group of college students at various universities in the United States.

Data were collected regarding the frequency and symptoms of certain clinical diagnoses; frequency and symptoms of attacks at different ages and sexes; and frequency and symptoms of attacks in different months.

Of particular interest to those who deal with these conditions in industry are the definitions of the various abnormalities used in this study: the word "cold" included a cold in the head or what is known as a "nose cold"; "bronchitis" included a cold in the chest with cough; "sore throat" included tonsillitis and pharyngitis; "influenza" included what is known as "grippe" or "flu"; and "pneumonia" was included in the report only if the diagnosis was so made by a physician.

The annual respiratory incidence in the family group was 1,851 cases per 1,000, or nearly two cases per person per year. Of this total about half of the cases were reported as coryza or head colds only; another fourth were made up of influenza, sore throat, and bronchitis, while the remaining fourth were combinations of two or more of these diagnoses.

The annual respiratory incidence for the students was 3,333 per 1,000, or more than three cases per person per year. The students reported upon themselves only and probably remembered and included more trivial attacks. Nearly three-fourths of the cases were reported as coryza or head cold only.

The family and student data agree in the general symptom picture for each diagnosis and in the differences between the four minor respiratory diagnoses.

The great majority of the symptoms occur with about equal frequency in attacks among males and females. Of 13 symptoms upon which information was obtained, constipation, obstruction of the nostrils, and expectoration were the only ones to show much difference, and these occurred with greater frequency among males than females.

There is considerable difference between the age curves of the incidence of the several reported respiratory diagnoses.

The percentage of respiratory attacks accompanied by given symptoms varies widely with age, and a few symptoms show definite differences between the sexes at specific ages.

These age differences persist in the symptoms of several reported respiratory diagnoses. The four minor respiratory diagnoses differ widely in symptoms present at specific ages.

The seasonal incidence curves of the four minor respiratory diagnoses differ greatly. Coryza has its peak incidence in the fall and decreases thereafter; influenza incidence in the years under study was usually low in the fall with a peak in the late winter or early spring; bronchitis and sore throat lie between these extremes.

The percentage of respiratory attacks accompanied by given symptoms varies widely in different months of the same year and in the same months of different years. The general symp-

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* Collins, Selwyn and Gover, Mary: Incidence and Clinical Symptoms of Minor Respiratory Attacks with Special Reference to Variation with Age, Sex, and Season. *U.S.P.H.S. Public Health Reports* 48: 1155-1178, September 22, 1933.

toms, such as fever, aching, and headache, are most frequent in attacks during months when influenza is prevalent.

Respiratory cases reported under some designation other than influenza show some tendency toward more frequent general symptoms, such as fever, aching, and headache, during months when influenza is prevalent.

The chief value of such studies as this is the gradual increase in our knowledge of what constitutes a so-called "norm" so that the given experience of any particular industry may be compared with the average or expected experience, and thus may be gained an indication as to whether unusual factors are operating to produce a favorable or unfavorable result. Such studies should, therefore, be encouraged in every way, so that our knowledge of this important and difficult subject may be enhanced.

Methylene Blue in Cyanide Poisoning

THE use of methylene blue in treating cyanide poisoning has been the subject of much controversy within recent months. The subject is of considerable importance and interest to industrial physicians, not because of the relative frequency of cyanide poisoning in industry, but because of its deadly effects when it does occur.

Some investigators, among them Brooks, have shown that in animal experiments, if rats were made unconscious by the inhalation of hydrocyanic acid gas, the rate of recovery would be accelerated considerably by intraperitoneal injection of 1% methylene blue solution. The extensive use of this gas in the fumigation of ships has been of extreme interest to the United States Public Health Service; therefore Trautman* undertook to determine the value of methylene blue injections in the treatment of animals poisoned by inhalation of lethal or near-lethal doses of this gas.

The almost universal observation of experienced persons dealing with individuals overcome with HCN gas has shown that they either die very quickly or when removed to the open air, recover within a relatively short period of time and recover completely. This appears to be logical because when inhaled, the poison is immediately absorbed into the blood stream and immediately exerts its effects; contrariwise when the victim is removed to the open air, the absorption of additional poison stops at once and that which is already in the blood begins to pass off by way of the lungs. If, however, a large dose has been absorbed, the individual is usually dead when removed from the gas, but when a sub-lethal dose has been absorbed, the progress of poisoning stops at once and the process of recovery begins. In borderline cases in which sufficient gas has been absorbed to inhibit respiration and prevent its spontaneous return, but not sufficient completely to inhibit other body functions, if artificial respiration is used, a sufficient amount of gas may be removed through aeration of the lungs to relieve the effects on the respiratory center, this being followed by resumption of breathing and recovery. It appears, therefore, if methylene blue is of value, it would be indicated in such border-line cases.

In the present series of experiments, guinea pigs, white rats, and rabbits were exposed; after considerable study it was found possible to determine when the animal had received a lethal or near-lethal dose. In each group of animals, suitable controls were selected, these receiving no methylene blue treatment. From a tabular analysis given in this report, it is quite evident that a large number of the controls survived and the difference between the number of those which survived after treatment and the number of controls which survived is apparently not significant.

It is apparent from these experiments on rabbits, white rats and guinea pigs that injections of 1% methylene blue solution were of no value in the treatment of hydrocyanic acid gas poisoning where the animals had absorbed by inhalation, lethal or near-lethal doses of gas in a short period of time. There was a slight variation of results in the different animals used, but the average of results indicated no advantage in favor of methylene blue treated animals.

Physical Impairment and Weight

THE relationship between health and weight has been a matter of considerable interest both to the medical profession and life insurance companies. In some instances, industrial physicians have even relied upon fluctuations in body weight as a basis for further investigation of possible abnormal conditions or physical defects.

It is acknowledged that no satisfactory means have been found by which the bony structure of

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* Trautman, J. A.; Methylene Blue in the Treatment of HCN Gas Poisoning. *U. S. P. H. S. Public Health Reports* 48:1443-1447, December 1, 1933.

any given person, in considering the type of body build, can be objectively determined. Important enough, however, is the fact that no standard research into the physical condition of the general population in relation to weight has been made, with the exception of the study referred to here by Britten.*

The material upon which this study was made was obtained through the Division of Research of the Milbank Memorial Fund and includes medical examination records of 3,037 men markedly under or over weight.

Referring particularly to death rates, tuberculosis is the only condition showing any marked excess mortality among underweight persons. Among overweight persons, a large number of causes of death are primarily degenerative in nature. In these instances, however, it is quite likely that a number of such conditions might not manifest themselves on physical examination because of their very nature.

With regard to impairments and hygienic errors, it was discovered that there was considerable variation in the rates in the different age periods and also with reference to marked under weight or marked over weight.

The impairment rate data can very easily be divided into two parts: those rates of physical impairment which decrease as weight increases and therefore occur most prominently among the underweight persons; and those rates of physical impairment which increase as weight increases and therefore occur most commonly among the overweight persons. With reference to the former, tuberculosis, low blood pressure, pathological signs in lungs not suspicious of tuberculosis, low specific gravity of urine, nervousness, varicocele, gastric disturbances, constipation, frequent colds, nasopharyngitis and simple goiter make up the list of conditions which showed high rates. With regard to rates of physical impairment which increase as weight increases, edema, high blood pressure, high specific gravity of urine, flat feet, sugar in the urine, rheumatism or gout, granular casts, hyaline casts, enlarged heart, albumin in the urine, and rapid pulse occurred most frequently.

It is difficult, however, to make such an arbitrary division and state that these impairments occur with any regularity in the various age groups in the underweight and overweight persons, since there is considerable variation in occurrence. In other words, there has not yet been established the same degree of accuracy regarding physical impairment occurrence, as obtains in the making of diagnoses of abnormal conditions which cause death.

At least, however, a start has been made and it is highly significant, particularly to industrial physicians, that there should be some sort of basis for the rating of physical impairment with regard to overweight and underweight.

From this study it can be said that an analysis of the rates of impairment in a group of more than 3000 men who are markedly under and over the standard weight for their heights and age has shown similar relations to those which have previously been established in the case of mortality conditions. In the underweights, tuberculosis stands out most clearly, while in the overweight group degenerative conditions especially as indicated by urinalysis findings and high blood pressure are those which occur most frequently.

* Britten, Rollo H.: Physical Impairment and Weight. *U.S.P. H.S. Public Health Report,* 48: 926-944, August 4, 1933.

Treatment of the Common Cold

THE COMMON cold has been found to be in certain industrial studies, the cause of absenteeism approximating 35% in various industrial groups. Any specific type of treatment, therefore, which will materially lessen the course of the common cold and either abort it or reduce the amount of time of disability, is of special value in affecting industrial absenteeism.

Recently Diehl* in a study conducted by the dispensary of the Health Service of the University of Minnesota demonstrated the relative value of various drugs and drug combinations in the treatment of 1,039 cases of acute coryza, 262 cases of subacute or chronic colds, 114 cases of influenza and 53 cases of acute pharyngitis.

Among the conclusions reached, perhaps the most important was that combinations of papaverine with codeine, papaverine with dilaudid, and papaverine with morphine were followed by "definite improvement" in from 74 to 78% of the cases and in the dosages used these combinations seemed to be practically nontoxic. This type of treatment was limited to cases of acute coryza and it was also established that none of the medications studied seemed to be of benefit in the subacute or chronic colds.

Worthy of note is the fact that sodium bicarbonate, acetylsalicylic acid and combination of acetylsalicylic acid - acetphenetidin - caffein

* Diehl, Harold S.: "Medicinal Treatment of The Common Cold." *J.A.M.A.* 101: No. 26, 2042-2049 (December 23, 1933).

gave little if any better results in the treatment of acute coryza than the lactose tablet used as a control, each being followed by "definite improvement" in from 35 to 42% of cases.

Most important of all to industry was the conclusion that a computation based on incomplete reports of time lost from usual activities by patients who received these various medications would suggest that it may be possible that the codeine - papaverine or dilaud - papaverine combinations would reduce materially the amount of time lost as a result of acute colds.

Here then is an excellent opportunity for the industrial physician who has a large number of persons to whom he may give first aid treatment in colds in industrial dispensaries, either to confirm or refute Diehl's work. If the results are found satisfactory, a definite inroad may be made upon the absenteeism caused by common colds in industry.

Importance of Cleanliness

RESISTANCE of the skin to infection and irritation depends upon a number of different factors which are usually so complex in their interrelationship that it is scientifically impossible, in a great many instances, to evaluate the importance of each one of them.

With particular regard, however, to what is known as oil dermatitis, it is known that personal cleanliness is important in prevention. Several years ago the United States Public Health Service made some observations on two groups of industrial employees exposed to an oil dermatitis hazard; in one group they initiated a thorough hand-washing program; in the other different means of prevention were tried without the cleanliness program. The occurrence of oil dermatitis was much lower in the group where there was a definite program of cleanliness. Several authorities believe that keeping the skin clean by thorough and fairly frequent hand washing is quite likely the most important factor in the prevention of oil dermatitis; a sufficient number of instances of such experience in industry now exist to bear out this contention.

In the infection of slight wounds there is an entirely different set of circumstances. A division of opinion is apparent among industrial surgeons as to whether the skin should be cleansed with soap and water after a wound—some contend that it should be done, while others use gasoline or some other grease solvent to cleanse the skin, rather than soap and water. In so far as is known at the present time, there are no figures bearing on these two methods which might show that one is better than the other.

Losses from infected wounds are tremendous. The experience of New York State shows that the ratio of the cost of a non-infected injury to the cost of an infected injury is as $86 to $204; the total of compensation awarded for infected injuries during one year was $2,978,777. The economic importance of infected wounds can be realized from these figures. Further, about 250,000 cases of infected wounds develop annually throughout the country; some insurance companies pay from 40 to 60% of their compensation claims for infected wounds; the lost time for disability averages 18 weeks longer in a case of infection than in a non-infected case; the total annual loss from infected wounds in industry approximates $104,227,500, while annual loss of time is about 4,458,333 weeks, or the equivalent of 85,737 years.

Most wounds affect the hands and fingers; 70 to 90% of all wounds occur to this portion of the body and very often in men who are doing work which involves the handling of oily machinery or parts which are very dirty. And the rate of infection of wounds of the hands and fingers is just twice that for other wounds.

As to infection it must be kept in mind that it is usually caused by an invasion of the bacteria which are normally present on the skin but which have no injurious effects so long as the skin remains unbroken. Numerous experiments have shown that soap and warm water, used either with a scrubbing brush or by massaging the hands well with the lather, will remove most of the bacteria; in fact soap is considered to be one of the best and most readily available antiseptics. It is for this reason that surgeons, when preparing to do an operation, first thoroughly cleanse the hands by the use of hot water, soap and a brush, which they call "scrubbing up." It is true that they use certain antiseptic solutions, but the removal of the greatest part of the infective material on the skin is accomplished by the scrubbing process.

The irritation of the skin by hundreds of different chemicals in industry is another story. In many instances this can be circumvented by the application of a bland ointment which protects the skin against chemical irritation. There are many variations of this procedure, but the basic principle is to prevent the protective layer of oil on the skin from being dissolved by the oil-solvent properties of certain injurious chemicals.

Industrial Medicine Digest

Occupational Disease Claims

FRIEDA S. MILLER, Director, Division of Women in Industry, New York State Department of Labor, *in Industrial Bulletin* (February, 1934):—Compensation for industrial disease in New York State can be awarded only in case of those diseases contracted in processes specifically named in the Workmen's Compensation Law; consequently the health effect of work with substances outside the coverage of the act is a matter of special concern both to employers and workers. A knowledge of the properties of new substances is particularly important so that proper precautions may be taken to protect the worker from possible deleterious effects. The careful analysis of all occupational disease claims, both compensated and uncompensated, is one means available at present for ascertaining new and unrecognized hazards and provides at least some indication of their nature and possible extent, although undoubtedly other hazards exist for which compensation claims have never been made. More information would, of course, have to be obtained concerning the nature of such hazards before a complete picture could be presented of the gaps and inconsistencies of the present occupational disease act. However, claims for compensation furnish at present our best indicators of occupational health hazards and it is for this reason that an analysis of the claims heard on the New York City occupational disease calendar during the year just closed is again presented. * * *

The agents causing occupational diseases are many and the complexity and number increase yearly. Lead, for the first time in many years, is no longer first on the list. This place has been usurped by dyes of the aniline type, which are compounds of benzol. The three cases of benzol *per se* have been classified separately here. The large incidence of cases due to dye may be accounted for by increased filing of dermatitis claims, principally by tailors and furriers. Here the depression may play a large part. These workers in previous years, having longer seasons, longer hours in season and consequently greater pay, might have gone to their own physicians, but now, as soon as the dull season is upon them or even threatens, many file claims and prosecute those claims vigorously. There were 126 claims in the group in which dye was reported as causative agent, comprising 18% of all claims. Forty-nine received awards, 50 were disallowed and 27 were still pending. The most interesting aspect of these claims is that in only 24, or 19% of the 126 cases, was disease due to actual handling of the dye itself; in 102 or 81% it was due to working with dyed materials.

Lead this year ranks second as a disabling agent, claimed as the causative agent in 103 cases. Of these, 37 were given awards, 23 disallowed, 42 are still pending and one was transferred to another calendar. In this group one is not surprised to find that only 37 cases were due to working with metallic lead or its oxides while 66 were due to lead paints. In the factories where lead compounds are made, precautions are taken to keep the process enclosed so far as possible, proper exhaust systems are installed, masks are used, proper washing facilities are provided and in many plants constant medical supervision is supplied. In the case of painters, however, there are practically no precautions against inhalation (masks), few against ingestion (resulting from unclean hands and finger nails); frequently there are no washing facilities available, and medical supervision is a personal responsibility. Painters are the nomads of the lead exposure industries, many of them having a different employer every few weeks and in some cases even every few days, while men working in lead plants are fairly stationary.

An agent of equal importance with lead, from the point of view of number of claims, is found in soaps and alkalies which in most cases produced a dermatitis venenata. There were 103 such cases, 54 having been granted awards, 34 disallowed, and 15 still pending. The conditions caused are usually very disabling because of the fact that the occupations in which soap is handled require constant immersion of the hands in water. This of itself causes softening and maceration of the tissues and renders the skin more susceptible to irritation. The worker in these cases often thinks he is cured and goes back to work too soon, or often returns, because of economic pressure, when he knows he is not cured, and the condition again lights up to an alarming degree.

Final Disposition of Cases	Total		Percent distribution of disallowed cases
	Number	Percent	
Total Cases	692	100.0	
disallowed	283	40.9	100.0
Disability less than 7 days	*79*	*11.4*	*27.9*
Not covered by the Act	*49*	*7.1*	*17.3*
Non-appearance of claimant	*42*	*6.2*	*14.8*
Not an occupational disease	*42*	*6.2*	*14.8*
No medical evidence	*29*	*4.2*	*10.2*
No proof of occupational disease	*17*	*2.4*	*6.0*
No casual relation	*8*	*1.2*	*2.8*
No notice within statutory period	*7*	*1.0*	*2.4*
No claim filed within statutory period	*3*	*.4*	*1.1*
No jurisdiction	*1*	*.1*	*.4*
Disease not contracted in course of employment	*1*	*.1*	*.4*
Disease not contracted within one year	*1*	*.1*	*.4*
Closed at claimant's request	*1*	*.1*	*.4*
Claimant not located	*1*	*.1*	*.4*
Grounds not given	*2*	*.3*	*.7*
Awards made	250	36.1	
Cases pending	154	22.3	
Cases transferred to other calendars	5	.7	

Occupational Disease Claims Classified According to Decision of Referee

Even to the layman, it has been a well known fact for many years that certain plants cause a very painful condition of the skin, the best known being poison ivy. Laborers in parks and at similar outdoor occupations come in contact with sumach, oak and poison ivy, all of which will cause skin eruptions in susceptible subjects. There were 37 claims for conditions arising from handling plants, fruits, vegetables, etc. Only seven cases received awards, while 28 claims were disallowed and two are pending. A situation has arisen in this connection which is well worth attention and is now being investigated. Seven men were employed to wash vegetables or handle them for produce companies. These men filed claims for dermatitis due to handling vegetables and as the act does not cover this, they were disallowed. The condition might, however, be the result of two factors: (1) constant immersion of hands in water, where vegetables are being washed, rendering the skin hypersensitive or (2) exposure to some chemical used either as a fertilizer or as an insecticide in the cultivation of the vegetable. In the second case the chemical might have been one which is enumerated in the act and if so, the claimant would have received an award.

Causative Agent	Total cases	Cases disallowed	Awards made	Cases pending	Cases transferred to other calendars
Total	692	283	250	154	5
Dye	126	50	49	27	
Per se	*24*	*8*	*11*	*5*	
Dyed material	*102*	*42*	*38*	*22*	
Lead	103	23	37	42	1
Metal or salts	*37*	*11*	*12*	*14*	
Paints	*66*	*12*	*25*	*28*	*1*
Soap	103	34	54	15	
Fruits, vegetables and plants	37	28	7	2	
Oil and grease	37	10	21	6	
Petroleum products	33	12	11	9	1
Acid	27	7	15	4	1
Cement and lime	21	6	10	5	
Trauma	20	6	7	7	
Dust	17	15		2	
Carbon monoxide	10	6	3	1	
Chrome	10	1	5	4	
Friction	10	4	4	2	
Lacquer	10	6	2	2	
Arsenic	8	3	3	2	
Contact with infected person or material	6	6			
Flour, sugar and spices	6	6			
Phosphates	6	3	3		
Tar and tar products	6	1	3	2	
Brine	5	4	1		
Chemicals	5	5			
Formaldehyde	5	3	2		
Metal polish	5	3	1	1	
Wood alcohol	5	3	1	1	
Cyanide	4	1	1	2	
Benzol	3	1		1	1
Steam	3	3			
Sulphur dioxide	2	1		1	
X-ray and radium	2			2	
Sulphides	1			1	
Miscellaneous	39	25	9	4	1
Unknown	17	7	1	9	

Occupational Diseases Claims Classified According to Alleged Causative Agent and Disposition of Cases

Oil and grease were the causative agents in 37 cases; 21 received awards, 10 were disallowed, six are pending. The present wording of the law covering these cases results in an unreasonable distinction between the different manifestations of skin irritant due to oil and grease. It is a fact well known to the medical profession that oil and grease fill up the "pores," setting up an irritation with a secondary infection that is known as folliculitis. The law, however, covers only dermatitis. If the law read "dermatoses" or "skin conditions" rather than 'dermatitis" due to oil, this discrimination would no longer exist.

Petroleum products were responsible for a group of 33 cases of which 11 received awards, 12 were disallowed, nine are pending and one has been transferred to another calendar. This group includes the solvents used in dry cleaning and these are numerous. The dry cleaning industry has advanced by leaps and bounds in the past decade in the volume of its business, and with this increase in volume there has been a marked decrease in price. Consequently new and untried solvents (from the standpoint of effect on human economy) have followed each other in rapid succession in the endeavor to lower costs in the plant. These solvents may cause not only dermatitis by direct irritation of the skin but also marked constitutional symptoms from the inhalation of fumes.

Acids of various sorts were the basis of 27 claims, for 15 of which awards were granted. Seven were disallowed, four are pending and one has been transferred to another calendar. Cement and lime were the causative agents in 21 cases, 10 of which received awards. The next group, that of occupational disease following trauma, consisted of 20 cases.

The group of cases due to dust, 17 in all, 15 of which were disallowed and two pending, furnishes evidence of one of the most cruel and startling gaps in the occupational disease law. Many of these conditions are truly occupational and yet the law does not recognize them at all. All men engaged in grinding, polishing, drilling, or stone cutting, are exposed to the inhalation of dust which may cause changes in the lungs, known generally as pneumonokoniosis or specifically, according to the dust, as silicosis, siderosis, etc. In the great majority of cases, the final stage is tuberculosis, as the pneumonokoniosis may activate a dormant tubercular lesion. For this condition there are only two remedies, the wearing of masks to prevent the inhalation of the dust and the use of tools with suction apparatus which automatically removes the dust.

Included here is a small group of workers in which there need never have been any disability if the right kind of physical examinations and

medical supervision had been provided —workers suffering from asthma. Asthmatic attacks may be brought on by exposure to dust to which the individual has become sensitized, as for instance fur dust, which might precipitate an attack in an asthmatic furrier. This could be avoided if physical examinations were made and tests done on asthmatics to determine susceptibility to any dust with which they came in contact in their work.

Four groups of equal importance so far as number of cases is concerned are those due to carbon monoxide, chrome, friction and lacquer. Of the cases of carbon monoxide over half (six) were disallowed owing mostly to the fact that no sequelae of carbon monoxide poisoning are covered, as unfortunately the word "sequelae" was omitted from that paragraph of the law. The remaining groups are so small, numerically, that they are of interest merely as indicating that such hazards do exist. The only remaining classification which needs some word of explanation is the "miscellaneous" group. Under this heading are classified claims based on indefinite causes such as sewage, garbage, muscular effort, food, hot or cold water, gases and fumes, oyster juice, a spider bite, eating frankfurters, polish, dirt, pressure, light, medicinal preparation. The nature of the claims themselves accounts for the large number of disallowed cases.

Clinical Silicosis

DR. R. R. SAYERS, *in Journal of The American Medical Association,* (August 19, 1933):—This paper relates to the clinical manifestations of silicosis and has been based on a study carried out among 7,722 miners employed in the Picher district of Oklahoma; the work was done by the United States Bureau of Mines, United States Public Health Service, in cooperation with the Metropolitan Life Insurance Company and the Mine Operators' Association. Comparisons are made with the similar work and results obtained by Dr. L. J. Irvine and his associates in their study of the silicosis problems in South Africa.

By clinical manifestations is meant personal data, the past history of diseases, occupation, present history, physical examinations, and roentgen and laboratory observations.

Reference is made to the definition of the first stage of silicosis by the Committee on Pneumonoconiosis of the Industrial Hygiene Section of the American Public Health Association:

In the first stage (corresponds to anteprimary stage of South Africa) the symptoms of uncomplicated first-stage silicosis are few and often indefinite. The man may apparently be quite well and his working capacity not noticeably impaired. Slight shortness of breath on exertion and some unproductive cough, often with recurrent colds, are the most usual symptoms. The man may have a little less ability to expand his chest than formerly, and the elasticity of the chest may be slightly impaired. The earliest specific indication of the presence of silicosis is the radiographic appearance, consisting of generalized arborization throughout both lung fields with more or less small discrete mottling. This characteristic mottling is due to shadows cast by the discrete individual nodules of fibrous tissue in the lungs and is essential to the diagnosis of silicosis; without this finding the diagnosis of silicosis is not sustained except by autopsy.

It was noted that the chief symptoms of persons having silicosis were shortness of breath, irritating cough with little or no expectoration, and loss of strength. It was also discovered that these symptoms occurred among men who did not have silicosis, although the incidence was less in the negative group.

According to Irvine the conformation of the chest usually shows little or no alteration, although the upper chest may show some flattening. The percussion note is typically of average normal quality. The practically constant clinical signs are: (1) a certain lack of elasticity of the chest wall during the movements of respiration, together with (2) a somewhat reduced air entry, and (3) a characteristic alteration of the inspiratory murmur from the normal "vesicular" character to a higher pitched or "harshened," "thinned" and commonly somewhat shortened type, the expiratory murmur, although somewhat prolonged, remaining fainter than the inspiratory.

This type of breath sound is very characteristic, with some modifications, of silicosis in all its stages, and this clinical sign has also the significant character of more or less complete generalization. It is first noticeable at the anterior, lateral and basal regions.

In the minority of cases, however, the breath sounds may be simply diminished, but breath sounds which are simply diminished or which, on the other hand, are merely somewhat louder or more "pronounced" than normal are not specially characteristic of silicosis.

Usually there are no accompaniments, but a stray rhonchus may be heard here and there.

This complex of physical signs is almost constantly present in cases of a slight degree of "simple" silicosis. The cough may be put down to the coincident bronchitis and bronchiolitis, the recurrent pains to slight intercurrent local pleurisies.

The usual pictures of the second and third stages of silicosis are an extenuation of the findings both clinically and by x-ray.

Finally, it should be emphasized that, while the cardinal symptom of silicosis is shortness of breath, the cardinal sign decreased chest expansion, and the earliest specific indication the characteristic roentogenographic appearance, the diagnosis should be made only by a correlation of all the facts; symptoms, signs, occupational history, and laboratory and roentgen observations.

Etiology of Silicosis

DR. A. J. LANZA, *in Journal of The American Medical Association,* (August 19, 1933):—Reference is made to the definition of silicosis as formulated by the Committee on Pneumonoconiosis and the Committee on Standards of the American Public Health Association, at a joint meeting in November, 1932:

Silicosis is a disease due to breathing air containing silica (SiO_2) characterized anatomically by generalized fibrotic changes and the development of miliary nodulation in both lungs and clinically by shortness of breath, decreased chest expansion, lessened capacity for work, absence of fever, increased susceptibility to tuberculosis (some or all of which symptoms may be present) and by characteristic x-ray findings. The disease is divided arbitrarily into first, second and third stages for convenience of description and possible compensation purposes.

Considering the actual causes of silicosis, the primary cause may be stated to be free silica, inhaled in the form of dust; such dust particles must be less than 10 microns in their greatest

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diameter and most of the dust penetrating the alveoli is less than five microns in diameter. Standards for dust analysis have been established by the United States Public Health Service.

The rate of development of silicosis is dependent largely upon the dosage of silica and this in turn is determined by three variables—the amount of dust in the inspired air, the amount of silica in the dust, and the extent of exposure.

As to contributing causes, it is quite likely that individual susceptibility, race, and living conditions do not have any effect on the contracting of silicosis. Syphilis, however, makes a definite difference: persons with a 4 plus Wasserman reaction develop silicosis more quickly than the Wasserman negative group and the disease runs a more rapid course in a syphilitic individual.

In summarizing, Lanza states: "Silicosis is a widely spread occupational disease and its peculiar relationship to tuberculosis, the difficulties of diagnosis, and the extreme difficulty associated with efforts for prevention and control, all combine to make it a disease of major importance. For this reason, I desire to emphasize most strongly the necessity for the precise recording of the patient's occupation, both by physicians and hospitals, especially in cases which present pulmonary symptoms. Not merely the patient's present but also his previous occupations should be ascertained.

Recent investigations and studies have revealed various types of pneumonoconiosis which tend to confuse further both diagnosis and prognosis. This makes imperative an accurate marshaling of all the etiologic factors in the consideration of any case in which the inhalation of silica dust is concerned."

Silicon Dioxide Content of Lungs

DD. WM. D. McNally, *in Journal of The American Medical Association,* (August 19, 1933):— The author considers the silicon dioxide content of the lungs in health and disease, making specific references to the findings of three previous investigators, as reported in current literature.

An analysis of the lungs in 21 samples gave an average of 1.13 mgs. per gram of dried lung tissue. It is stated that any lung containing over 2 mgs. of silicon dioxide per gram of dried tissue indicates undue exposure to a dusty atmosphere.

Comparisons were made between persons in non-dusty and dusty occupations, showing that the amount of silicon dioxide in the lungs of the latter was considerably above those of the former in most instances.

In concluding, McNally states that the normal lung contains 1.13 mgs. of silicon dioxide per gram of dried tissue; that a chemical examination of the lungs should be made in every case coming to autopsy, in which there is a history of a dusty occupation.

Pathologic Reaction in Pneumonoconiosis

DR. LEROY U. GARDNER, *in Journal of the American Medical Association,* (August 19, 1933): —A review of the pathology of pneumonoconiosis is given in this article, dividing the changes into five general phases: (1) early diffuse parenchymatous disease due to the accumulation of phagocytes and local inflammatory changes in the immediately adjacent connective tissues; (2) linear perilymphatic proliferation; (3) beading

of the trunks due to chronic proliferative changes in associated lymphoid tissues; (4) enlargement of the mediastinal lymph nodes due to proliferation of the local connective tissues, and (5) late chronic proliferation and nodular formation in the finer connective tissues of the pulmonary parenchyma. These differences in reaction are explained by the localization of the various types of particles effected through the activity of the phagocytes, by the degree of impairment of the lymphatic system, and by the capacity of the various kinds of particles to set up proliferation in the connective tissues.

In the consideration of the effects of mixed dusts, reference is made to the United States Public Health Service study on the Barre granite cutters. Three case histories are cited and discussed in detail.

It is generally assumed that only the quartz or free silica content of granite dust is of significance in the production of disease; that the other components act as inert diluents, which reduce the concentration of silica which is inhaled, and that because of such dilution granite pneumonoconiosis develops much more slowly than that produced by pure silica. On the other hand, it is equally possible to assume that the nonsiliceous components of granite dust may of themselves excite biologic reaction and that possibly they may modify the characteristic effects of pure quartz.

The data presented indicate that a granite pneumonoconiosis does not begin with the formation of nodules in the lmyphoid tissues as in ordinary silicosis, but that it presents only the characteristic perilymphatic proliferation of the nonsiliceous dusts. The observations in the case of the Bethel granite cutter who had worked as long as 28 years would suggest that in the absence of infection the predominant lesion continues to be of the nonspecific linear type. This contention does not depend solely on the observations in a single autopsy but it is supported by the large group of roentgenologic observations in the Barre study and by experimental disease produced in guinea-pigs. Furthermore, both clinical and experimental evidence suggest that the "silicosis" of the granite workers does not create a condition of increased susceptibility to tuberculosis as quickly as that resulting from disease produced by pure silica.

As a working hypothesis, it is proposed that in the absence of infection the non-siliceous components of granite dust are largely responsible for the reaction that is produced and that possibly by their presence the free silica is held in check. When tuberculosis or to a lesser extent other infections complicate the picture, the free silica cooperates with the living organisms to produce a nodular type of reaction. Such a concept is not new, for "infective silicosis" has played a prominent part in the speculations of the South African observers. They and others have recognized that, in combination with tuberculosis, silica produces nodular reaction much more readily than when it is acting alone. Some have even gone so far as to maintain that in all silicosis there is an element of infection; this, however, is not necessarily true, for typical silicotic lesions have been repeatedly produced in uninfected animals of many species.

To prove the proposed hypothesis it will be necessary to study much more autopsy material from granite cutters dying without tuberculosis and to perform experiments in which animals are subjected to the inhalation of quartz dust combined with proper amounts of feldspar and mica. In an attempt to evaluate the effect of small amounts of silica, such as has been assumed for granite, an experiment is now in progress in which animals are being exposed to quartz dust for only one hour each day over a period of several years. These observations are presented to suggest that caution should be exercised in drawing inferences as to the reaction to any combination of dusts until they have been intensively studied both individually and in association with one another.

Roentgenology of Pneumonoconiosis

DRS. HENRY K. PANCOAST AND EUGENE P. PENDERGRASS, *in Journal of The American Medical Association*, (August 19, 1933):—In this paper Pancoast and Pendergrass consider the roentgenological aspects of pneumonoconiosis and the difficulties in differential diagnosis. Based on recognized histologic changes and characteristic roentgenographic appearances, the authors have supplied the following outline of predominant appearances in the roentgenograms:

1. The perivascular-peribronchial-lymph node phase in which the hilar shadows and the linear markings show increased prominence.

2. The early interstitial stage characterized by a rather faint homogenous haze appearing first in the right lower lung field and then in the left, and gradually spreading in extent. Small discrete dense nodules may or may not coexist.

3. The nodular phase which is productive of the most characteristic roentgenographic appearance of pneumoconiosis. Typical in this instance are the small, dense, discrete nodules throughout both lungs.

4. The advanced diffuse or terminal fibrosis stage of silicosis which shows massive areas of fibrotic tissue.

In the differential diagnosis, the conditions which are most likely to be confused at the perivascular-peribronchial-lymph node stage are: (a) passive congestion of the lungs as a result of cardiac decompensation; (b) passive congestion associated with coronary thrombosis; (c) advanced bilateral bronchiectasis; (d) asthma; (e) infiltrating or permeating malignant metastases; (f) polycythemia or erthyremia; and (g) mycotic infections.

In the early interstitial stage, the confusing conditions may be a tuberculous pneumonic process, and interstitial pneumonitis, bronchosinusitis, or rheumatic pulmonitis.

In nodular predominance, the confusing conditions may be (a) nodular metastatic malignant conditions of the lungs; (b) actinomycosis; (c) sporotrichosis; and (d) leptothrix infection. The advanced diffuse or terminal fibrosis stage is to be differentiated mainly from chronic diffuse tuberculosis or an accompanying tuberculosis is to be definitely diagnosed. Occasionally such areas may simulate the presence of a mediastinal tumor.

Consideration is also given in this paper to the association of primary bronchogenic carcinoma with pneumonoconiosis and several case histories were described illustrating this point. The conclusion reached, however, is that pneumonoconiosis is probably not at present a pre-disposing factor in primary bronchogenic carcinoma.

Recommendations of Special Industrial Disease Commission

THE Special Industrial Disease Commission of Massachusetts after a study of working conditions in 314 granite establishments and 225

foundries of the Commonwealth has made the following recommendations:

Definitions—Wherever used in these recommendations, the words here listed are defined as follows: (1) The "granite industry" shall include all establishments where granite or granitic rock is quarried, crushed, cut, turned, carved, lettered, surfaced, polished or otherwise machined or finished; (2) The "foundry industry" shall include all establishments where ferrous or nonferrous metals are cast in sand molds; (3) "Siliceous" dust shall mean dust containing either silica or silicates in amounts which may be harmful to health; (4) "Harmful" shall mean capable of causing personal injury, as determined by the Department of Labor and Industries; (6) "Silicosis" shall mean that form of pneumonoconiosis caused by the inhalation of siliceous dust other than that of asbestos; (6) "Asbestosis" shall mean that form of pneumonoconiosis caused by the inhalation of asbestos dust.

1. Preventive Regulations. That the Department of Labor and Industries be directed to prepare and issue, under authority of Chapter 149 of the General Laws, rules and regulations specifically applicable to the granite and foundry industries for the protection of persons engaged in those industries from diseases caused by the inhalation of dust, such rules and regulations to emphasize (a) removal of the dust at the source wherever possible, (b) the obligation of employees to utilize, as required by the rules and regulations, such means of protection conforming thereto as are furnished to them, and (c) the requirements embodied in the following recommendations numbered five and six.

2. Certificate of Compliance with Regulations. That legislation be enacted to provide (a) that no person shall engage in any business to which the rules and regulations proposed in the preceding recommendation are applicable without a certificate of compliance with the rules and regulations, such certificate to be issued by the Department of Labor and Industries and to be revocable for cause, and (b) that the proposed statute become effective nine months after the effective date of the rules and regulations.

3. Employers must Provide Insurance. That the Workmen's Compensation Act be amended to provide (a) that insurance under the act be compulsory, with respect to all employees whose employment involves the production of siliceous dust or exposure thereto, on all employers in the granite and foundry industries, these industries being particularly hazardous to the health of those engaged therein, and (b) that the above provision embodied in this recommendation may be extended to such other industries as the commissioner of labor and industries and the commissioner of insurance, acting jointly, may determine to involve a hazard sufficient to warrant such extension.

4. Insurers Must Carry Certificated Risks. That legislation be enacted to provide that, as a condition precedent to the granting of a license to an insurance company to engage in workmen's compensation insurance business in this Commonwealth, it must agree (a) to insure any employer in the granite or foundry industry who is the holder of a certificate of compliance as provided in the recommendation next but one preceding and who, having applied for insurance to three insurance companies and having been rejected by them, is assigned to the licensee by the commissioner of insurance, and (b) to comply with rules and regulations to be made by the commissioner of insurance for the equitable distribution of occupational disease losses in such risks above a fair proportion which shall be chargeable to the carrying company.

5. Entrance Physical Examinations. That legislation be enacted to provide (a) that no person not previously so employed in the Commonwealth shall engage in any occupation in the granite or foundry industry in which there may be harmful exposure to dust unless his physical fitness so to do has been determined, within the 12 months next preceding, by the Department of Public Health by means of an examination; (b) that any person not prohibited by statute or regulation thereunder from engaging in such occupation and who has not been so examined within the 12 months next preceding shall be given opportunity to be so examined within 30 days after filing with the department a written application including a signed statement that it is his purpose to engage in such an occupation; (c) that the examinee shall be notified in writing, within 10 days after such examination, whether or not he is found physically fit to engage in such an occupation; (d) that if an examinee found unfit files with the department within 10 days after such notification a written appeal from the finding, it shall be reviewed by the Medical Board of Review provided for in the following recommendation numbered 14, which board shall hold a hearing if requested by the examinee and shall render to the department a decision which shall be final and of which notice shall be sent to the examinee as hereinbefore provided, (e) that no member or employee of the department or of the board, nor any of their records, shall be subject to subpoena in connection with the case of any person so examined, nor shall any such records be made public except at a hearing as hereinbefore provided; (f) that there shall be issued to each examinee found physically fit to engage in such occupation a certificate of fitness which shall bear the signature of the examinee and the date of the examination and shall be duly executed under the direction of the commissioner of public health, and (g) that no further examination of the lungs shall be necessary as a condition precedent to such employment of a person to whom a certificate of fitness has been issued within the 12 next preceding.

6. Annual Physical Examinations. That legislation be enacted to provide (a) that every person engaged in any occupation in the granite or foundry industry in which there may be harmful exposure to dust shall annually be examined by the Department of Public Health to determine his physical fitness to continue in any such occupation; (b) that no finding of such physical unfitness shall be made except on evidence of active pulmonary tuberculosis; (c) that every examinee found unfit so to continue shall be so notified in writing; (d) that if an examinee found unfit files with the above department within 10 days after such notification a written appeal from the finding, it shall be reviewed by the Medical Board of Review provided for in the following recommendation numbered 14, which board shall hold a hearing if requested by the examinee and shall render to the above department a decision which shall be final; (e) that, if the decision is contrary to the finding reviewed, the examinee shall be so notified in writing; (f) that, if the decision confirms the finding reviewed, or if an examinee found unfit fails to appeal as hereinabove provided, the Department of Public Health shall in writing notify the Department of Industrial Accidents and the Department of

Labor and Industries that the examinee has been found physically unfit to continue in any occupation as hereinbefore described and the last-named department shall so notify the examinee and his employer, if any; (g) that an examinee so found unfit may apply, not less than 12 months after such finding, for a re-examination in accordance with provisions (b), (c), (d), (e), and (f) of the recommendation next preceding, any certificate of fitness issued in such case to bear the word "readmitted"; (h) that any person who, having received notice of physical unfitness from the Department of Labor and Industries as hereinbefore provided, continues in any occupation for more than 30 days in contravention thereto or returns to such occupation except after readmission as hereinbefore provided, shall forfeit all rights to compensation for disability due to pulmonary disease under the Workmen's Compensation Act; (i) that no member or employee of the Department of Public Health or of the Medical Board of Review, nor any of their records, shall be subject to subpoena in connection with the case of any person examined as hereinbefore provided, nor shall any such records be made public except at a hearing as hereinbefore provided; (j) that the Division of Tuberculosis of the Department of Public Health shall give special preference in the extension of its facilities to persons who, deprived of employment because of a finding of unfitness as hereinbefore provided, have been resident in the Commonwealth on the effective date of this legislation or for one year prior to the date of such finding; (k) that the Division of Public Employment Offices of the Department of Labor and Industries shall give special preference in the extension of its facilities to the dependents of such persons; (l) that the Division of Public Employment Offices of the Department of Labor and Industries and the Division of Rehabilitation of the Department of Education shall give special preference in the extension of their facilities to such persons if subsequently restored to fitness for employment; (m) that every person who, having been deprived of employment because of a finding of unfitness as hereinbefore provided and being in need of relief or assistance, has been a citizen of the Commonwealth on the effective date of this legislation or for one year prior to the date of such finding shall, on having received compensation for disability due to pulmonary disease in the full statutory amount, or at once if ineligible for such compensation, be entitled to assistance as provided for by Chapter 118 A of the General Laws, as amended, irrespective of any provision thereof contrary hereto, for as long as such need and unfitness continue, and (n) that the official or body providing such assistance may at any time require that any such person be re-examined, as hereinbefore provided, in order to determine whether or not the unfitness continues.

7. Compensation for Pulmonary Disability Restricted. That the Workmen's Compensation Act be amended to provide (a) that no person who has previously received compensation for disability due to pulmonary disease, either in total statutory amount or in a lump sum under final adjudication, shall again be eligible for compensation for disability due to any such disease, and (b) that, except in cases pending before the Industrial Accident Board on the effective date of this legislation, no person who has not been a resident of the Commonwealth for the five consecutive years immediately preceding the date of injury shall be eligible for compensation for disability due to silicosis or asbestosis.

8. All Persons Exposed Subject to Preventive Regulation. That Chapter 149 of the General Laws be so amended as clearly to authorize the Department of Labor and Industries (a) to make such investigations, determinations, rules, regulations and orders as are necessary to the protection of the health and safety of all persons engaged in any employment, as defined in Section 1 of that Chapter, and (b) to make such investigations, determinations, rules, regulations and orders as are necessary to the protection of the health and safety of the public with respect to such employments.

9. Physicians' Reports Paid For, Privileged. That Section 11 of Chapter 149 of the General Laws be amended to provide (a) that the Department of Labor and Industries shall pay a fee of fifty cents for each report of disease made pursuant to the provisions of that section, and (b) that no such report shall be subject to subpoena, nor shall its contents be made public.

10. Schedule and Experience Rating for Occupational Disease Risks. That legislation be enacted to authorize the commissioner of insurance to approve or disapprove plans for computing premiums for an individual employer whose employees are exposed to dust or other occupational disease hazards, according to the existence and effectiveness of machines or devices designed to remove or reduce such hazards.

11. Cancellation of Policies Restricted. That legislation be enacted to provide that no workmen's compensation insurance policy shall be subject to cancellation by either party on less than 30 days' notice in writing.

12. Division of Occupational Hygiene. That legislation be enacted to provide for the establishment, in the Department of Labor and Industries, of a Division of Occupational Hygiene, with a director, such personnel having special knowledge of the causes and prevention of occupational disease and such additional staff and facilities as may be necessary to the efficient performance of its duties, which shall be (a) to investigate conditions of occupation with reference to hazards to health and to determine the degree of such hazards, (b) to investigate and evaluate means for the control of such hazards, (c) to assist in the preparation of rules and regulations for the prevention of occupational accidents and disease, and (d) in cooperation with the Department of Public Health, to promote occupational health and safety education.

13. Occupational Medical Staff. That legislation be enacted to provide that there be added to the personnel of the Division of Adult Hygiene of the Department of Public Health a medical staff and such assistants and facilities as may be necessary to the efficient performance of their duties, which shall be (a) to investigate and report to the Industrial Accident Board on the medical aspects of all cases coming before the board for compensation for silicosis, asbestosis or pulmonary tuberculosis and to so investigate and report in such cases coming before the board for other occupational diseases as the board may refer to them, their reports and findings to be admissable as evidence before the board or any member thereof, but no member or employee of the department to be subject to subpoena in connection therewith, (b) in any fatal case coming before them, to order an autopsy if in their opinion it is advisable for the purpose of determining a fact material to any party at interest, (c) to make such findings of

physical fitness as are provided for in the preceding recommendations numbered five and six, (d) to study the effects upon health of materials and processes used in industry, in conection with which studies no member or employee of the department shall be subject to subpoena, and (e) in cooperation with the Department of Labor and Industries, to promote occupational health education.

14. Medical Board of Review. That legislation be enacted to provide for appointment by the Public Health Council of a board of three physicians, one to be a clinical pathologist, one a roentgenologist and one a specialist in diseases of the chest, to be designated as the Medical Board of Review, whose members shall serve and be compensated on a per diem basis and whose duties shall be (a) to review, on request by the Industrial Accident Board, reports and findings of the Department of Public Health provided for with respect to compensation cases in the recommendation next preceding, and (b) as provided in the preceding recommendations numbered five and six, to review findings of physical fitness made by the Department of Public Health, hold hearings and render decisions thereon.

15. Statistical Data. That legislation be enacted to direct and enable the Department of Industrial Accidents to prepare from its records, as a factual basis for preventive regulation by the Department of Labor and Industries, statistical data on occupational injuries.

Treatment of Burns

DR. I. C. MUNGER, JR., *in Nebraska State Medical Journal,* (August, 1933): — The physician treating burns is concerned with two primary considerations; first to prevent death by combating shock and toxemia; second, to promote healing by properly protecting the burned area, and preventing infection.

Treatment may be divided into the immediate or emergency type, the primary or early treatment and the secondary or late.

Included under emergency treatment are the procedures for the relief of pain, the control of shock, and the preparation of the burned area. The first is accomplished by the hypodermic administration of a heavy dose of morphine, and should be the first thing done for the patient. The narcotic is then repeated often enough and in large enough doses to keep the patient free of pain, always remembering to discontinue its use as promptly as possible because the consequent depression of respiration is a factor in the not uncommon complication of pneumonia, not to disregard the danger of narcotic addiction. Combating shock is accomplished by the application of external heat in the form of blankets, hot water bottles, hot pads, or in some cases the warm saline bath. Stimulants in the form of caffeine or adrenalin may be given hypodermically, although strong warm coffee by rectum serves admirably to provide both heat and stimulation. If hemorrhage has occurred blood transfusion may be indicated, although, even in the absence of hemorrhage, severe shock is an indication for transfusion. Davidson attempts to give transfusion before the intervention of shock in a patient who appears to have a possibly lethal burn; then if shock develops the transfusion is repeated within the 24 hours. Whereas their mortality from shock during the first 36 hours has constituted 25% of their deaths, after the institution of the above regime, during a two years period, no death had occurred from shock during the first 36 hours. Any evidence of anoxemia, due to circulatory or respiratory failure, is to be combated by oxygen administration. When the patient is free from pain and recovering from the immediate shock of the burn, an attempt is made to free the areas involved, of all dirt, clothing, or other foreign material. Soap and water serve well, though benzol or ether may be required to remove grease. In the case of a severe burn where the clothing must be cut away, this can best be accomplished by first placing the patient in a bath of 2% or 3% saline at a temperature of 100°, the tub being padded with blankets and sheets. It might be said at this point that many surgeons use a bath of this type for the continued treatment of their patients, the patient's excreta simply being drained from the tub and fresh saline added. It is certain that such a method gives a degree of comfort not attained in any other way, and for the patient to whom death will certainly come this offers the most comfortable treatment for his dying hours.

In the early or primary treatment, the general or systemic conditions requiring attention are anhydremia, acidosis, chloride depletion, pain, and shock if persisting. Fluids are given freely—by mouth, water and fruit juices; by rectum, normal saline, soda bicarbonate solution or both—intravenously, glucose in normal saline. Roughly one should give about a liter of fluid per 25 lbs. of body weight in 24 hours. This is continued for the first 48 hours or longer if any symptoms of shocks, toxemia, or acidosis are present. The guide to the need

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for further fluids is the repeated estimation of hemoglobin percentage which of course indicates the degree of anhydremia, varying in direct proportion. The observation of hemoglobin percentages also has a prognosticating value, it being found that an increase of 40% if maintained for any length of time is incompatible with life; when it reaches 125% of the normal value, life is precarious. The occurrence of edema is the signal to discontinue fluid administration. The author has found but one report where a burn fatality was felt to have been due to the over-zealous administration of fluid. While the kidney output may be markedly lowered, it soon rises in response to the administration of chlorides and glucose. Here also blood transfusion may be indicated. While it has been shown that the blood depletion is largely due to plasma loss, and the addition of saline in a large measure compensates for this, if transfusion is desired it should be of the exsanguination-transfusion type as advocated by Robertson and Boyd. The exsanguination method overcome toxemia by removing the toxin laden blood cells and replacing them with blood from a donor. This is practicable only in children on account of the large amount of blood required, usually figured on a basis of 35 cc. per pound of body weight. The site chosen is usually the superior longitudinal sinus or saphenous vein as they allow a more free flow of blood. Citrated blood at a temperature of 100° is used, alternately giving and removing 50 to 100 cc. at a time, depending on the condition of the pulse. If, however, fixation methods are used locally, the toxemia can usually be prevented or controlled to such a degree that removal of toxins by exsanguination will not be necessary.

In the group of agents which act by fixing the burned tissues, the principle ones used are picric acid and tannic acid. The former is prone to cause poisoning, a number of such cases having been reported in the literature, and for this reason its use is inadvisable. The use of tannic acid, first advocated by Davidson in 1925, has become wide spread and is probably the most widely used method at this time, receiving by far the largest mention in the literature. In the secondary or latent period there are two phases of treatment, the local and the systemic. The latter consists in the rehabilitation of the patient's general condition, and will probably not require consideration except in the cases of third and fourth degree burns, or extensive second degree burns. It is not uncommon for a marked anemia to develop when any very extensive granulating area is present, and, since its onset may be insidious, the examination of the blood for reductions in red cell count or hemoglobin is indicated. If mild, the anemia can be controlled by the administration of iron, copper, liver and tonics; if severe, these efforts should be preceded by the transfusion of whole blood.

The two conditions found in the burned area requiring attention during this period are unepithelized surfaces and contractures. If the granulating surfaces are small in area and filling in well from the edges it may be possible to avoid skin grafting. The promotion of the skin growth is facilitated by saline baths or dressings; and exposures to the shorter wave lengths of ultra-violet light which stimulates the epithelial cells and controls infection. However, large areas should be subjected to graft implantation as soon as a healthy bed can be formed. The choice of the type of graft to be used must be decided in each individual case. The pinch graft can be used most easily and leaves an area which heals quickly but is not adapted to exposed surfaces because of the cosmetic effect. Here split or full thickness grafts are used. In most all cases autogenous implants will be used unless the area involved is so large as to render impractical the removal of so much skin from the patient. Great care must be used with heterogenous grafts as they take with difficulty even if the donor and recipient have matching blood types.

Lead Absorption and Excretion

DRS. ROBERT A. KEHOE, FREDERICK THAMANN, and JACOB CHOLAK, *in Journal of Industrial Hygiene*, (Sept. 1933):—This is a series of four papers regarding lead absorption and excretion in primitive life, and in modern American life, the sources of normal lead absorption, absorption and excretion in infants and children, absorption and excretion in certain lead trades, and absorption and excretion in relation to the diagnosis of lead poisoning.

A summary of the findings of the authors may be given as follows:

Experimental observations have demonstrated that lead is a natural constituent of the soil and the vegetation of primitive regions in Mexico, and that lead occurs in the blood, the urine, and the feces of human beings who live naturally on local agricultural and animal products.

Since the fecal output of lead is predominantly an expression of unabsorbed lead which has been ingested with food or otherwise, we must recognize the necessity for a changed technic in animal and human experimentation which will set up an adequate control on the amount of lead ingested. Otherwise, the quantity of lead excreted from the tissues into the alimentary tract is purely conjectural. The variability in the amounts of ingested lead is so great as to obscure the results of many experimental studies in which this factor has not been controlled, and in which the conclusions have been based largely upon the fecal elimination of lead. Even when the analytical methods employed have lacked the sensitivity necessary to detect the amounts of lead which commonly occur in the feces, we cannot assume that they have operated with sufficient uniformity to provide dependable data. Thus the entire question of the influence of various agents on the excretion of lead from the body, which has received its greatest impetus from the work of Aub et al., requires re-examination. Litzner, Weyrauch, and Barth have investigated this problem recently, using sensitive analytical methods and drawing their conclusions from the results obtained on the urine. They have agreed with the conclusions of Aub and his associates as to the influence of the calcium metabolism on lead absorption and excretion, but they have failed to find evidence of an increased lead elimination under the influence of ammonium chloride. Their conclusions are not entirely convincing in either instance. Their data show variations in the urinary lead excretion, unrelated to experimental procedures, sufficiently great to obscure the effects of medication. We have observed a similar variability, the range of which is influenced greatly by the general magnitude of the excretory rate—i.e., the greater the gross output of lead, the greater is the variability from day to day.

Caution must be exercised, therefore, in the interpretation of experiments of this type.

The investigation of common foods has demonstrated the general occurrence of small amounts of lead in these materials. Certain classes of foods frequently contain more than average amounts of lead; among these in the order of increasing importance are, bread-stuffs, meats, processed meats, ice cream, candy, leafy green vegetables, and certain fruits. The comparison of primitive Mexican and American foods indicates that a factor in the higher lead content of the latter is to be found in the general use of lead-containing insecticides.

A group of American children without know exposure to lead compounds, and with no evidence of lead intoxication were found to excrete lead in the urine in amounts varying from 0.02 mg. per liter to 0.18 mg. per liter, with a mean excretion of 0.08 mg. per liter. The mean lead excretion in the feces was 0.08 mg. per gram of ash. The lead excretion of a group of Mexican children living under essentially primitive conditions was found to vary from nil to 0.03 mg. per liter of urine, with a mean of 0.015 mg.; their mean fecal lead excretion was 0.04 mg. per gram of ash of feces. Analyses made on large amounts of human milk from normal mothers with negative histories in respect to occupational lead exposure, yielded lead in amounts varying from nil to 0.05 mg. per liter. Four of five premature or stillborn human foetuses showed the presence of small amounts of lead in their tissues, despite the absence of maternal lead exposure; the lead was found in the bones of three, in the liver, brain, and skin of two, and in the intestinal tract of one. The largest total amount was 0.41 mg. of lead in a still-born foetus at term.

The mean lead excretion of all types of workmen in a white lead plant was found to be 3.76± 0.26 mg. per sample of feces, 0.57± 0.03 mg. per gram of ash in the feces, and 0.24± 0.01 mg. per liter of urine. The corresponding values for workmen in a storage battery manufacturing plant were respectively 2.53± 0.18, 0.45± 0.03, and 0.18± 0.01 mg. Workmen exposed only to inorganic lead dusts in a tetraethyl lead manufacturing plant, excreted lead at mean rates of 0.56± 0.06 mg. per fecal sample, 0.20± 0.02 mg. per gram of fecal ash, and 0.14± 0.01 mg. per liter of urine.

Clinical lead poisoning had occurred in the first two plants. The tetraethyl lead plant had shown none during the five years of observation.

These data have been combined with those obtained in similar studies on other groups, to illustrate the relationship between the extent of lead exposure and the rate of lead excretion. Evidence is presented for the belief that lead exposure is safe if it does not give a mean lead excretion of more than 0.6 mg. per day in the feces and 0.15 mg. per liter in the urine. It is concluded that the occurrence of lead poisoning may be expected under conditions in which lead is excreted at a mean rate above 1.1 mg. per day in the feces, and 0.21 mg. per liter in the urine.

Persons who have absorbed abnormal amounts of lead excrete lead at higher than normal rates after the cessation of lead exposure. The duration of the period of increased lead excretion depends upon the extent of lead absorption. The rate of lead output diminishes rapidly for a period of several weeks, after which there is a prolonged and gradual diminution in excretory rate until the normal level is reached. The relative intensity of the lead exposure is indicated by the initial height of the excretory level, by the sharpness of the decline in the excretory rate during the early weeks of freedom from exposure, and by the duration of the period of high excretion. Persons abnormally exposed to lead show the presence of unusual amounts of lead in their circulating blood during life and in their tissues at necropsy for variable periods of time after the discontinuance of their exposure. The total amount of lead in the body varies with the severity of the lead exposure and the interval between exposure and death.

The detection of an abnormally high rate of lead excretion, or an unusual amount of lead in the tissues is useful in estimating the severity of the lead exposure. It does not constitute proof of the existence of lead intoxication.

The recognition of either of these phenomena is greatly facilitated by the study of excreta or tissues soon after the cessation of exposure.

Radium Dial Painting

DR. LOUIS SCHWARTZ, et al., *in Journal of Industrial Hygiene,* (September, 1933): — This report contains the results of a study made on seven factories in which radium dial painting was done by 14 men and 228 women.

Two reports were made on this study, one including the scope of the work and the findings relating particularly to the examination of the workers; the second report has to do with an examination and analysis of the occupational environment.

The findings of the investigation may be summarized as follows:

Dust in the general air of the workroom was found to be radioactive (an average of 9.8x10 grams per 10 cubic meters of air). In the vicinity of dial painters the radioactive content of aerial dust was from two to three times that found in the general air of the workrooms. Near dusters it was many times as high.

The air of the workrooms, when freed from dust, showed the presence of radon in amounts averaging two thousand times that of normal air.

Workers were found to be exposed to gamma and beta radiations. Average gamma-ray exposure of the workers was equivalent to that which would be produced by about one milligram of radium 50 centimeters from a worker.

There is no evidence in this study of harmful effects, such as skin necroses, from radiations from sources outside the body.

The results of the gamma-ray, radon, and thoron tests were found to be in general consistent with one another.

Within the limits of accuracy of the measurements, no indication of the presence of radium was noted in the control group.

There was evidence of the accumulation of radio-active material in the bodies of workers in Group A (workers employed in radium work since January 1, 1927, only).

In both Group A and Group B, radium accumulation in the body was associated with the length of radium exposure.

This continuing rate of accumulation in Group A indicates that the abolition of pointing the brush with the mouth has not entirely solved the problem of radium deposition in the body.

The greatest amount of radium found in a worker in Group A was 3.5 mg., and the greatest amount found in a worker in Group B (not now employed) was 11.3 mg. (In certain serious and fatal cases from 14 to 180 mg. have been reported).

Although mesothorium is apparently no longer used in the paint, it is evident that this substance was still present in Group B, as judged by the test for thoron in the exhaled air.

The average red cell count and hemoglobin determinations manifested a slight tendency to be lower in Group A than among the controls. This tendency was more marked in Group B.

The average red cell count and hemoglobin determinations also showed some decrease with increasing amounts of radium in the body, but the relation was not marked for the amounts found in this study.

Other phases of the blood picture were negative or too indefinite for consideration.

X-rays of the alveolar regions did not indicate bone changes which could not be attributed to dental causes among workers in Group A. On the other hand, such bone changes were found in some workers in Group B, the condition of special importance being focal atrophy (osteoporosis or bone rarefaction).

The relation of these bone changes to increasing deposits of radium in the body is unmistakable.

Of particular interest are the suggestions for minimizing the hazards of radium dial painting; these are given in detail, but because of their importance are included here:

Rigid and continuous inspection of all processes involving the use of radium is advisable. This inspection should be supervised by a qualified officer responsible directly to the management of the plant.

Painting by hand should be done by a method which will eliminate the contamination of the mouth and fingers with radium. The practice noted in several plants was to use glass styluses or pens.

Styluses or pens should be wiped only on cloths (or other suitable material) kept moist with a solvent. One good practice noted was that of using a rubber sponge kept moist with a solvent held in a small container.

Racks should be provided so that pens, styluses, and stirring rods may be held securely and so that contamination of the work place with paint from this source may be prevented.

Paint containers should be not over ½ in. deep and should be so placed in a holder that retaining them in the hand is unnecessary.

Dry paint should be mixed with the liquid ingredients in a hood with openings for the hands only and provided with suitable exhaust ventilation to prevent escape of dust or emanation into the workroom atmosphere. Not more than a day's supply of paint should be mixed at one time, and it should be kept covered in a container lined with lead at least one inch thick. (This was practiced in one of the plants investigated).

In order to avoid any accumulation of radioactive materials in the workroom, it is suggested that mixed paint and materials be given out to the workers in quantities to last for short periods (preferably not longer than one hour), all materials and empty paint containers to be returned at the end of each period.

All utensils should be cleaned moist, and discarded material should be promptly removed from the workroom. The contents of all refuse cans should be removed daily.

Moist methods only should be used for removing paint from surfaces and in recovering radioactive material from old or rejected stock. Cloths used for this purpose should be replaced by fresh ones twice daily. Material collected for radium recovery should be segregated under lead protection and kept in a closed container.

Radium material should be stored in containers shielded by lead and kept as distant as possible from the workers. The lead should be at least one inch thick.

The room or rooms in which radium painting processes are carried out should be separate from those used for other purposes.

The floor and work places should be constructed so that they may be thoroughly and readily cleaned by a moist method. They should be cleaned daily after work hours. Pipes, window sills, and all surfaces upon which dust can accumulate should be cleaned weekly by moist methods. Wooden floors should be covered with some material which will prevent dust from accumulating in the floor crevices. Work tables or working surfaces should be of some polished, easily-cleaned material such as enamel.

Ample space should be allowed for each worker.

Illumination should be adequate and free from glare, with at least 10 foot-candles on the working place.

Drinking water should be provided by convenient bubbling fountains of the approved slanting jet type. The use of individual drinking cups of any character should never be permitted.

Convenient washing facilities should be provided, with arrangement for mixing hot and cold water in the faucet. At least one faucet should be available for each five workers. Paper towels and nail brushes should be provided by the employer.

Only neat, careful persons should be employed for radium work.

Workers should be provided with clean smocks at regular intervals.

Workers should keep their hands and work places scrupulously clean at all times, and foremen should see that this rule is rigidly enforced.

Eating during working hours and the presence of eating utensils or articles of food in the workroom should be prohibited.

The workers should wash their hands thoroughly and clean their fingernails before eating at noon and after work at the close of the day. This washing should be done under supervision to see that the regulation is properly carried out.

Adequate general ventilation should be provided (15 to 20 air changes per hour). Where the concentration of radium dust is high, additional ventilation of a local exhaust type should be installed as recommended or suggested in 6, 23, 24, and 25.

Painting by hand should be done beneath a sheet of plate glass, having a plano-convex lens (in one plant painting was done under lenses) at least three inches in diameter cemented to its lower surface. The glass should be large enough to cover all the radioactive material. The lens should be of such a focus that the face of the worker is not less than 14 inches from the work. It is suggested that if possible local exhaust ventilation should be provided beneath the glass.

Anyone who weighs, mixes, or distributes radioactive material should be protected from radiation by suitable lead screens and from radioactive dust by ventilated hoods.

Inspectors of radium-painted stock should conduct their work at open-front cabinets provided with exhaust ventilation of sufficient quantity to secure an air movement of 100 to 200 linear feet per minute at the face of the cabinet and in a direction toward the back of the cabinet.

Because of the high dust concentration, dusting and transfer press work as observed during the investigation should be abandoned or adequately safeguarded.

To test the effective enforcement of precautionary measures, periodic examinations, at least annually, including electroscopic tests (gamma ray and radon), blood examinations, x-rays of the maxilla and mandible, and tests of the radioactivity of the dust in the workroom air are advised. The results of these examinations should be communicated to the employees.

A statement of the precautions to be taken by the worker for the prevention of radium poisoning should be posted in each workroom. All applicants for work should be advised of the hazard and instructed in the observance of necessary precautions.

Toxicity of Organic Fluorides

DR. WILLIAM P. YANT, *in American Journal of Public Health* (September, 1933):—This report gives a resume of the toxicological properties of dichlorodifluoromethane and dichlorotetrafluoroethane which have been used and developed in a search for safe refrigerants.

The physical and chemical properties of these substances are described; experimental procedure and apparatus is given in detail, and response of animals to the compounds is reported.

A summary of the findings may be given as follows:

The results of exposure of dogs and monkeys to dichlorodifluoromethane and dichlorotetrafluoroethane vapor in air shows that the toxicity of these chemicals is very low.

Concentrations of 20% CCl_2F_2 by volume produce marked objective symptoms during exposure but they disappear very rapidly after termination of exposure, and no distinct harm is evident after many repeated exposures of eight hours daily. Exposure to 20% vapor in air continuously for 121 hours also produced marked symptoms but did not cause unconsciousness or death.

Concentrations of 14 to 15% $C_2Cl_2F_4$ by volume produce marked objective symptoms during exposure, but they disappear very rapidly after termination of exposure. No distinct harm is evident after as many as 21 consecutive exposures of eight hours daily. Twenty per cent concentrations or longer exposures daily produce evidence of harm. It is evident that on the basis of equal concentrations in air $C_2Cl_2F_4$ is distinctly more harmful than CCl_2F_2 but is of the same low order of relative toxicity when comparison is made with gases that present public or industrial health hazards.

The odor intensity and irritative properties of both CCl_2F_2 and $C_2Cl_2F_4$ are high enough to give distinct warning of their presence in concentrations far below those that produce death.

It may be added that the experiments described in this report were performed with a supply of material produced by a semi-commercial plant. It is very possible that small amounts of other halogenated hydrocarbons may have been present. It is known that certain other chloro-fluoro hydrocarbon derivatives have a higher order of toxicity than CCl_2F_2 and $C_2Cl_2F_4$, and considering the high concentrations of CCl_2F_2 and $C_2Cl_2F_4$ used in the experiments, the presence of fractional percentages of other compounds could have been responsible for a considerable part of the observed response.

Skull Fractures

DR. E. C. YATES, *in Kentucky Medical Journal*, (August, 1933): — The author considers the management of skull fractures involving the frontal sinus.

In a series of cases reported by Teachenor, in the first series of eight, none was operated upon and seven died: brain injury, one; intra-dural frontal abscess one; extra-dural abscess and meningitis, one; and meningitis, three. Of the second series of eight cases, all were operated upon early, with a mortality of 37.5%. Of these, 25% died from brain injury accompanying fracture and 12.5% from extracranial complications.

The cases may well be grouped in the different types of fractures as follows: simple, simple depressed, and compound comminuted.

A number of case reports are given by the author to illustrate the points which he makes in his article.

In summary, (1) incidence of frontal sinus fractures is small, but they offer a serious problem to the oto-laryngologist; (2) complications are relatively common; mortality 25% in untreated cases; (3) frontal sinus is so anatomically and physiologically arranged that complications of extension of infection are possible; (4) 10 cases are presented, with eight recoveries following operation, with one death due to laceration of brain; two cases untreated, with 100% mortality; (5) rhinorrhea as a complication suggests that interference is necessarily due to high incidence of meningitis; believe that operative interference depends on severity of fracture and condition of patient; (6) pneumocephalus is rare in fractures; treatment non-operative; and (7) pneumocephalus with rhinorrhea serious complication; should be operated upon after technique suggested by Dandy; mortality 50%.

Head Injuries

DR. WALTER E. DANDY, *in Journal of the American Medical Association*, (September 2, 1933): —The author discusses the treatment of acute injuries of the head; treatment of acute intracranial pressure; treatment of acute intra-cranial pressure not due to extradural hemorrhage; and the late effects of cranial injuries.

Dr. Dandy concludes from his discussions and experience:

Absolute rest is the most important assistance that can be made to nature's efforts to compensate for increased intra-cranial pressure. By careful and frequent bedside observations one can know at all times the state of intracranial pressure, and can in most instances subtract the important group of extradural hematomas from the remaining cases. All unnecessary and harmful or potentially harmful treatments should be avoided, even though relatives expect and urge something to be done. One will be told by enthusiasts of lumbar puncture and dehydration that, if fluid is not repeatedly withdrawn from the cranial chamber, one will be responsible for the later sequelae. One's conscience need not suffer on this account. Any after-effects, such as epilepsy, are due to the cerebral injury at the time of the accident. Conservative treatment adds not one iota to the later complications.

When nature shows unequivocal signs of failure, the only remaining rational treatment is to provide more room by a subtemporal decompression, the effects of which persist through the illness. A decompression is used only in selected cases in which the patients have survived six hours or more and are then in decline—less than 10% of all cases. I am well aware of the fact that at no time have the results in treating cranial injuries been so bad as when ill-timed and poorly

performed decompressions were in vogue and in many places almost a routine. We should greatly deplore the inference that the suggestions here presented would restore those distressing results which represented the worst as well as the best in clinical judgment and in operative skill. Such were and will continue to be the results of any effort at standardization of exceedingly difficult problems in diagnosis and treatment. Results will never be measured by the application of methods but by the quality of the men who apply these methods. We, therefore, refer only to the superior results that are attainable by a combination of the best in diagnosis and the best in treatment.

A general impression prevails that any one can handle injuries of the head, especially with the use of lumbar puncture and dehydration. On the contrary, there are few fields in which the most careful and persisting study and critical judgment are more necessary to attain the maximum results. Changes in the patient's condition frequently appear so quickly and the period in which favorable action is possible is so brief that life may truly hang by a slender thread, the breaking or strengthening of which is dependent on the quality of the physician's care and skill. By quality is not necessarily meant specialists, but experts—those using the best clinical judgment (which is usually dictated by common sense) and the best technical quality.

In the late sequelae of cranial injuries, an accurate diagnosis is an absolute prerequisite to the required form of treatment. Excepting inflammations, they offer a high percentage of complete recoveries and with very little risk.

THE BULLETIN

of

The American Association of Industrial Physicians and Surgeons

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Armour & Co., Union Stock Yards, Chicago

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THE OBJECT of this Association shall be to foster the study and discussion of the problems peculiar to the practice of industrial medicine and surgery; to develop methods adapted to the conservation of health among workers in the industries; to promote a more general understanding of the purposes and results of the medical care of employees, and to unite into one organization members of the medical profession specializing in industrial medicine and surgery for the mutual advancement in the practice of their profession.

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ANNUAL MEETING

THE 1934 Annual Meeting of the American Association of Industrial Physicians and Surgeons will be held in Cleveland, Ohio, Monday and Tuesday, June 11th and 12th. Headquarters will be in the Hotel Statler and the program and arrangements will be in charge of a committee of which Dr. A. G. Cranch, of the National Carbon Company, is the present chairman.

This will be the first meeting of the Association since 1931, and under the able direction of Dr. Cranch it should be a notable one. Since it coincides in point of time with the Annual Meeting of the American Medical Association, reduced fares will be granted by all railways. All members should plan to be present and should make hotel reservations early.

This meeting will be a very important one, as it will be necessary to elect new officers and an entirely new Board of Directors.

Like many of our other activities, our attendance upon medical meetings has been somewhat curtailed during the past three years; this will be a splendid opportunity to renew contacts, discuss problems and generate a new enthusiasm in our special line of work. As our meetings precede the scientific sessions of the A.M.A., to those who can remain a few days longer, its meetings will offer an excellent post-graduate course and acquaint you with many new things that have transpired in medicine during the past three years.

Every member who is interested in the affairs of the Association should endeavor to be present in order that the organization may have representation from all districts.

Medical Service in a Chemical Industry

By
G. H. Gehrmann, M.D., F.A.C.P.
Medical Director E. I. duPont de Nemours & Co.

IN 1910 the initial compensation laws were passed in this country and almost immediately industry felt the necessity of setting up a protection that would enable it to keep compensation costs within reasonable limits. As a result, there were established medical departments whose chief functions were to eliminate potential physical risks and take care of accidents arising out of occupation. This naturally resulted in the promiscuous rejection of many men who, although afflicted with some physical ailment, were quite capable of performing a safe and satisfactory day's work if properly placed. However, very little, if any, attention was given to the matter of proper placement, and hundreds of valuable workmen found it almost impossible to find employment except with those industries which did not require physical examination. Here again, a further injustice was done many of these men by placing them in positions for which they were not physically fitted.

Furthermore, in the beginning, industry did not hesitate to select the physically fit, but made no considerable effort to see to it that these men remained so. I would not take any considerable effort to imagine the tremendous number of men who would eventually have been thrown into the discard if this system had continued indefinitely, but those of us who have advanced with the modern industry and public health have long since realized how great and useful a service can be rendered to industry and mankind. Today, medical service in industry, properly organized and conducted, ranks equally important as operation, production and maintenance and has long since graduated from the class of a necessary evil.

Medical service in a chemical industry, or any industry, has three major principles of operation; namely, selection, protection and treatment. Selection and protection represent those principles upon which the real success of the entire service is dependent; while treatment, although extremely important, should represent the minor part of the work; and the number of occupational diseases occurring in any industry should, in a measure, indicate the success or failure of its selective and protective measures.

I will now consider these three major principles in their logical order and the further principles that should be considered under each.

Selection

A CHEMICAL plant represents a rather diversified industry and the working personnel is required to perform many and varied types of duties from unskilled labor to highly trained and skilled operators. The physical requirements of the individual operations are many; some require physical ability only, others require physical ability and a moderate degree of intelligence, and still others are dependent upon mentality and intelligence and require very little physical effort. Therefore, before any medical service can be properly organized, the physician or physicians in charge must have a good working knowledge of the requirements of each operation in the plant, and the only method of obtaining this knowledge is by going out into the plant and spending sufficient time to become familiar with the entire factory, the working conditions, the health hazards that exist and their manner of affecting the human body. This knowledge is of the utmost value to every industrial physician for obviously there can be no intelligent selection of men if the physician himself does not understand just what requirements each man must meet.

Obviously, a man with an already established skin irritation should not be sent to work in a material which will aggravate it, nor should a man with a chronic bronchitis be subjected to the irritations of fumes which will aggravate his condition. Mercury, lead, and arsenic are well-known gastro-intestinal irritants and therefore cannot be compatible with already established pathology.

Therefore, proper selection is necessarily dependent upon an examiner who is able to pick out individuals who will fit physically and mentally into their work, be efficient workmen for their employers and at the same time be able to perform their duties with a reasonable degree of safety. With this type of selection there should be relatively low numbers of rejections especially in a large plant where there are many types of work. Furthermore, the general efficiency of the personnel should be high and the labor turnover comparatively low.

As to the physical examination, I do not believe it necessary to go into details, but I would like to stress certain points which I feel are very important. A careful history of the applicant's past industrial life should be taken, as it often reveals facts that should be more carefully investigated. For example, men who have been working in lead are often fairly well leaded and constitute a most severe hazard in certain types of work. Individuals who are showing signs of established circulatory disturbances should not be subjected to the possibilities of absorbing the heavy metals, neither do I feel that nitro and amino compounds are safe for them. Then again, safe and efficient operation is often dependent upon at least moderately good vision, especially in occupations which require a man to watch finely graduated temperature and pressure instruments. I might go on pointing out further details to be considered, but after an examiner has learned his plant operations, the requirements of its individual operations will be readily recognized and his selections made accordingly.

Then having made the selections which should be productive of efficient workers for the employer and of minimum risk to the employe, it becomes necessary to exert every possible effort to maintain these conditions by adequate measures of:

Protection

PROTECTION is maintained by: one, periodic physical examinations of the workers; and, two, by frequent inspection of the working conditions.

Periodic physical examinations should be made as often as necessary, and the frequency must depend upon the toxicity of the material being handled and the rapidity with which a worker may develop signs of its effect upon the body. It is our practice to divide our men into groups according to the existing hazard and our periods range from once a week to once a year. Those doing office work are considered as ordinarily working without risk, but are examined once a year in order to help them maintain better health.

The periodic examinations of the relatively frequent group, such as once a month and once a week are not complete examinations but are specialized and for the purpose of detecting certain symptoms, typical of absorption of the materials in which they are working. The semi-annual and annual examinations are complete.

The detection of symptoms indicating toxic absorption, lead for example, should be followed by at least temporary removal of the worker from all possible exposure. In dealing with lead workers, it is, under some conditions, practically impossible to make the operation entirely free from the possibility of absorption and under these conditions the physical observations must be careful and frequent, and laboratory findings are essential, in order that the first signs of danger may be detected and the worker removed to safety. Workers in benzol must be watched with the greatest care and the operative conditions checked frequently in order to prevent serious or even fatal consequences.

Workers in nitro and amino compounds frequently get into trouble even with the closest observation and strictest regulations. Fortunately, however, the symptoms of systemic poisoning, although very severe in nature, last only a few days, are not fatal except in rare instances, and leave no permanent effects. Here, however, the medical department can be of invaluable service to the plant in detecting the very early signs of poisoning, instituting the proper methods of treatment and preventing the development of severe, acute symptoms.

I might go on and enumerate many other materials which must be handled with great care, but the general principles of medical management are similar or, at least, call for the same general plans of protection. I am merely trying to point out that any medical department can find plenty to do and ample room for improvement by organizing and maintaining adequate selective and protective measures.

Treatment

IN THE PAST, the subject of treatment covered the larger volume of the medical work in industry. However, the active safety campaigns have so reduced the number of accidents that now, in many industries, they are almost negligible. Of course, we all have a rather large volume of minor accidents to take care of and it is by their proper attention and the rigid enforcement of rules which demand that they all report for treatment immediately, that we are able to further materially reduce the numbers of major accidents. In the past, so many of our severe and disabling injuries were primarily very trivial in nature but neglect or inadequate treatment made possible the fertile field for infection. These cases do occur still, but they are actually rare and are practically all the result of failure to report until several days after the accident.

The realization that industry has been, and still is, responsible for occupational diseases, many of which are severe in effect and even fatal in character, has made possible the wide field of preventive industrial medicine of today. Industry now realizes the necessity of a medical service that protects rather than treats its conditions and thus we are working toward the time when the actual treatment of occupational diseases will have been replaced by prevention.

However, we have, unfortunately, not yet reached that happy solution and so for the present at least must still continue to treat conditions that we do not prevent. It is not my intention to even attempt to outline specifically the methods of treatment, but simply to deal with a few of the general principles.

The happiest results for all concerned depend upon an early diagnosis and early diagnosis is dependent only upon careful observation. We who are doing industrial medicine certainly have one great advantage over our fellow practitioners in that we can detect our diseases in their very incipiency and by simply removing the cause, establish a cure, and who can do likewise with any infectious disease, circulatory disturbance or neurological condition. In many cases where the detection is early enough, a simple correction of a faulty method of operation or handling can obviate the necessity of removal, thereby curing one case and preventing many others.

When signs of chemical intoxication are well established, the worker should always be removed from any possibility of further contact. Usually he can be returned to his work as soon as his symptoms have disappeared. Of course, there are some exceptions, such as those who show a decided hyper-susceptibility. Then again, I would hesitate to return to his original occupation, a man who has had a severe lead poisoning, and the fellow who is constantly getting into trouble on account of his wanton neglect to follow preventive rules and regulations; as a matter of fact, it is sometimes necessary to treat him to a one-way ticket to the gate.

In general, it may be said that the principles of treatment are early detection, prompt removal of the cause when possible and removal of the patient when this is not possible, and finally, the institution of specific remedies.

Summarizing medical service and its objectives, I would say that

First: Every industrial physician should have a working knowledge of his entire plant.

Second: Every new employe should be carefully examined and selected in such a manner as to enable him to work efficiently, safely and without undue injury to his health.

Third: Every industrial physician should protect the health of his workers by

1. Frequent, periodic examinations.
2. Frequent inspection of the working conditions in the plant.

Fourth: Treatment is dependent upon early detection with immediate correction of the cause or removal of the worker.

Fifth: The entire service is dependent upon three principles: Selection, protection and treatment.

Zinc

DR. CECIL K. DRINKER, AND LAWRENCE T. FAIRHALL, Ph.D., Department of Physiology, Harvard School of Public Health, Boston, Mass., *in Public Health Reports*, (August 11, 1933):—Recent investigations have greatly simplified and defined the problems arising from the ingestion and inhalation of zinc and zinc compounds. It is now known that zinc is not a poison in the usual sense of the word. That is to say, pure zinc, in contrast to metals such as arsenic, lead, antimony, and cadmium, has no poisonous qualities even if taken in large amounts. Certain zinc compounds, such as zinc chloride, are highly irritating and caustic; but this action is the common property of an infinite number of chemical sub-

stances. Certain other zinc compounds, such as zinc oxide or zinc stearate, on account of their fine state of division or their tendency to flocculation, may do harm, but not on account of their zinc content. Such effects are understandable and avoidable, a far different situation from that which would exist were the zinc ion poisonous in itself, so that after absorption one might count upon a series of unfortunate effects ending with elimination, with safe storage, or with the death of the subject.

This point of view is not in accord with the reputation zinc has held, a reputation which has arisen from the fact that zinc in the majority of instances occurs in ores with such substances as lead, arsenic, antimony, and cadmium, all definitely poisonous. Thus the older literature of general and industrial hygiene contains frequent descriptions of what are listed as cases of acute or chronic zinc poisoning, in which the symptoms are found to be attributable to contaminating metals.

In the light of present knowledge it is worth while to redefine the hygienic position of zinc. This may be done from two aspects—first, that of the relation of zinc and zinc compounds to the health of the general public, and, second, the relation of zinc and zinc compounds to the health of workers engaged in the manufacture of such compounds * * *

IN RELATION TO INDUSTRIAL HYGIENE. In the course of the manufacture of zinc and zinc compounds, a single condition remains which calls attention to zinc, and this again is not due to a specific attribute of the metal but is apparently due to the physical state of certain zinc compounds. This is the familiar chill and fever formerly thought to be produced by zinc oxide alone but now known to occur when oxides or finely divided powders of other metals are inhaled. In typical cases following inhalation of freshly formed zinc oxide or large amounts of old oxide, the worker after a few hours experiences malaise, then a severe shaking chill with a rise in temperature of considerable magnitude. Philip Drinker and his associates (2) (3) (4) (5) have studied these chills under circumstances permitting close clinical observation; that is, employing pure zinc oxide they have produced chills in themselves and in volunteers. Their findings were that ague occurs in from two to four hours after zinc-oxide inhalation. They found that in laboratory experiments 45 mg. of zinc oxide (measured as zinc) per cubic meter of air can be inhaled for 20 minutes without causing symptoms. In a metallurgical plant 14 mg. per cubic meter produced no reaction in eight hours. Differences in susceptibility make it impossible to give absolute figures as to the concentrations certain to cause chills. Apparently no one is entirely immune, given a sufficiently large inhalation.

Philip Drinker found it easy to demonstrate the immunity which exists following a zinc chill, and this immunity is perhaps related to the leucocytosis which occurs with the chill and persists in many workmen exposed daily to zinc-oxide inhalation (1).

Batchelor, Fehnel, Thompson, and K. R. Drinker (1) made an exhaustive clinical and laboratory study of 24 workmen exposed over periods of time varying from two to 35½ years to the inhalation of varying concentrations of zinc in the form of zinc oxide, zinc sulphide, or fine metallic dust, and found no acute or chronic illness in any way ascribable to zinc. These observations are significant because the exposure to zinc was high and contamination by lead and cadmium was very low. Many of the men studied had often had zinc chills and, in addition had experienced persistent dosage by inhalation.

Turner and Thompson (6) examined 212 brass founders and reported that those who experienced attacks of metal fume fever were "apparently in somewhat poorer condition than those exposed to the fumes but not affected by them."

One may sum up the evidence in regard to the zinc chill as follows: It is a decidedly unpleasant experience and, to a mild degree, incapacitates one the day following the attack. Where the inhaled oxide is uncontaminated by other metals, there is no definite evidence of chronic damage even from repeated chills. At the same time the condition is easy to prevent by properly arranged exhaust hoods or the wearing of masks, and conditions making chills possible should be eliminated. Mention has been made of the fact that the chill is not necessarily due to zinc. Philip Drinker (5) found it possible to produce fume fever in himself and his associate (R. M. Thomson) by inhaling magnesium oxide. The same result has been reported for other metals. The ease with which zinc assumes a physical or physico-chemical state capable of causing fume fever when inhaled is apparently the reason why the condition has been thought to be due to zinc alone.

Finally, it is proper to mention a mechanical effect of zinc experienced in connection with zinc stearate dusting powders. Such powders have frequently caused death in infants who have inhaled them directly from the can. These instances have no bearing upon the problem of zinc toxicity. They occur when any dry, adhesive powder is inhaled in sufficient amount.

SUMMARY. A summary of the hy-

The Industrial Doctor
OFFICIAL SECTION OF THE NEW YORK STATE SOCIETY OF INDUSTRIAL MEDICINE

Published under supervision of the Ways and Means Committee of the New York State Society of Industrial Medicine. Editorial office, F. E. Redmond, Managing Editor, 406 Root Building, Buffalo, N. Y. Articles appearing herein do not necessarily reflect the opinion or policy of this journal nor of the New York State Society of Industrial Medicine.

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FRANK E. REDMOND, MANAGING EDITOR

VOL. 3 MARCH, 1934 No. 3

gienic position of zinc with such restrictions as experience makes advisable is as follows:

1. In 1925, a publication of the Public Health Service (Reprint 1029) placed a limit of five parts per million of zinc in drinking water. This limit has been applied freely to many conditions in which zinc is ingested. Since the zinc ion is not of itself poisonous, and many times five parts per million may be taken without harmful effects, it is suggested that this limit, which gives a relatively innocuous metal an undeserved reputation for toxicity, be increased or done away with altogether.

2. Foods or beverages, with the exception of simple or chlorinated drinking water, should not be stored in zinc-lined or galvanized containers. Acid drinks and foods will invariably cause solution of zinc and the formation of simple compounds of zinc which irritate the stomach and may cause vomiting.

3. A single industrial condition arises from zinc and this condition is not produced by zinc alone. This is the "zinc chill," better known as metal fume fever. The different groups of symptoms described as chronic industrial zinc poisoning, together with other complex ills which have been ascribed to zinc, may be disregarded, as they are due to contamination by other substances.

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Eye Injuries

DR. ROBERT J. WARNER, *in Journal of The Tennessee State Medical Association,* (July, 1933):—According to the Bureau of Workmen's Compensation, Department of Labor and Industry of Pennsylvania, the sight of 8131 eyes was destroyed by industrial accidents in that state between 1916 and 1929, inclusive, 219 of them resulting in the loss of both eyes; and more than $11,000,000 was paid out in compensation for eye injuries. In 1929 the loss of eyes increased 9.1%. In Wisconsin during the last four years 2767 men received compensation for eye injuries, of which two were fatal, six caused permanent total disability, 579 permanent partial disability, and 2180 temporary disability.

The outstanding remedy for eye loss through accidents in industry is the use of goggles and protective shields—with still more strict regulations insisting upon their adoption by management and further orders that their employees use them. Present-day goggles are equipped with lenses adapted to the user and are comfortable compared to those of a few years ago, so there is little excuse now for men not wanting to wear them. Great possibilities exist for embracing in the design of many types of machine adequate eye shields, while the types that may be readily fitted on afterwards should always be used where it is obvious that they are needed. This aspect of vision is, however, a big subject in itself.

Of 1049 cases of permanent eye injuires reported by the Travelers' Insurance Company, when analyzed as to general cause, show the following distribution: flying bodies, 80%; hit by tools or moving parts of machines, 8%; splashing liquids (molten metal or acid), 7%; explosions, 2.5%; falls, 2%; infections, .5%.

We may approach our subject of eye injury by two methods: by the etilogic or by the anatomic route. Both have certain advantages and are equally important, the one for general and the other for exact description of special cases and their treatment.

Few injuries are confined to one part of the eye, and the injury to one portion may be felt in another, the whole affecting the function or the cosmetics of the organ, and the injury to sight in many instances affects the whole organ and its function.

Following are the chief types of eye injuries: wounds without retention of foreign bodies; wounds with retention of foreign bodies; contusion; concussions; ruptures; and dislocations; thermal injuries, including the effects of heat, light, electric, and chemical burns, burns from acids and alkalies; the effects of explosions, gunshot injuries; infected wounds.

Complicated wounds of the orbit pass first through the lids or the eyeball to the contents of the orbit, the lacrimal glands, the orbital fat, extraocular muscles, Tenon's capsule, the nerves and blood vessels, and the optic nerve; these may be further complicated by simultaneous injury to, and resultant disease of, the bony walls of the orbit, the adjacent sinuses and the brain.

A foreign body to be retained within the globe must have been aseptic and have carried no germs with it in its passage, and tolerance of the tissues must have developed.

The choroid, ciliary body and iris most easily become irritated, the vitreous and retina next, but the lens is especially tolerant, for it is derived from epithelium and composed mostly of albumin, tolerating foreign bodies as well as other epithelial structures.

The prognosis depends upon the amount of damage; the size and character of the wound; whether penetrating, perforating, or nonperforating; whether foreign bodies are carried in, and whether infected or not.

Pulmonary Disease

DR. JOHN POTTS, *in Texas State Journal of Medicine,* (May, 1933):—There is a widespread fallacy among the laity and in the minds of the public generally that various types of gases will cause tuberculosis. This does not agree, however, with the consensus of physicians who have had considerable experience with these types of cases.

Injustice in litigation is the result of four different factors, the first being the slap-stick diagnosis made by a physician who does not understand that he is dealing with a medicolegal problem; the doctor's weakness in currying favor with the patient at the expense of scholarship and truth; the professional witness who is the tool of damage-suit lawyers; and the doctor's ignorance of what constitutes disability, either partial, total or permanent.

An important point to remember is that such litigation could not proceed unless there are doctors who lack either integrity or scholarship or both, who will testify of disability which does not exist in fact. This lays the foundation for emotional and prejudicial decisions by lay juries.

Sulphur Dioxide in City Air

CARLISLE SCHADE, *in The Journal of Industrial Hygiene,* (May, 1933):—A great deal of interest has centered around the possible pollution of air by sulphur dioxide from the industrial activity of different types of plants and industrial groups.

Several investigations have previously been made in addition to the study here reported. One of these was made in 1927-28 by the Bureau of Mines, another by the Pittsburgh Testing Laboratory in 1931-32, and the present study by the Mellon Institute in the year 1932.

The Bureau of Mines data showed variations in the monthly maximum between 0.2 parts per million by volume and 1.1 parts per million.

The survey by the Pittsburgh Testing Laboratory varied from a monthly maximum of 0.4 parts per million to 2.5 parts per million.

In the present study by the Mellon Institute, the monthly maximum varied from 0.1 to 1.1 parts per million.

It was concluded that the results of this survey indicate that the amount of sulphur dioxide present in Pittsburgh air is too small to be a cause of concern from a hygienic standpoint.

Acute Back Injuries

DR. T. T. BAGWELL, *in West Virginia Medical Journal,* (August, 1933):—Injuries to the back may vary from a simple sprain of the muscles and ligaments to a complete fracture dislocation of the spine, associated with severance of the cord followed by a total permanent paralysis from the site of injury down.

All cases, no matter how trivial they may seem, should be given a thorough physical examination, including both anterioposterior and lateral x-ray views. Many times definite evidence of injury will be found that otherwise might have easily been overlooked.

Among the simplest of these injuries which come under our observation are the sacroiliac and lumbosacral sprains. These may be acute or chronic. The acute cases present a definite history of a single injury, in which a sudden acute strain was placed upon the lower back, followed immediately by pain of varying intensity at the site of the injury. Later pain may radiate down the course of the sciatic, lumbar or superior gluteal nerves. Occasionally these referred pains become more intense than that of the injured area. Shifting of position is attended with pain. The patient states that when he is seated he has trouble arising to the erect position, and while standing, assuming the sitting position is painful. Occasionally in a uni-lateral sprain of the sacroiliac joint an abnormal posture is assumed. Most often a tilt to the opposite side affords relief, though in a smaller percentage of cases the list is to the same side. The latter is usually true only in those cases associated with sciatic pain when the sciatica is the most disturbing feature.

In the difficulty of differentiating between chronic sprains which may follow acute sprains, and other conditions, Steindler mentions four points: first, a definite circumscribed area of localized tenderness, frequently associated with spasm of the surrounding muscles; second, a typical position which aggravates the pain; third, a position that when assumed affords relief from the pain; and fourth, acute sprains respond to immobilization of the joint in the position of relief, or in such a position as will relax the sprained ligaments.

The method of gradual hyperextension is especially applicable to cases of fracture of the lower dorsal and lumbar vertebrae without paralysis. The apparatus may be used after laminectomy in favorable cases when the spinal cord is found not to be extensively traumatized so that a functional recovery is anticipated.

Under this method of treatment recovery is usually complete if there has been no paralysis and a large majority of the cases are able to return, in time, to their former laborious occupations.

Another type of fracture of the spine seen frequently in miners, usually as a result of direct violence such as the falling of a reasonably small piece of coal or slate, is a fracture of one or more of the transverse processes. Pain, tenderness, and limitation of motion are the prominent symptoms, and the fractured processes can be seen on the anteroposterior x-ray plate. Such injuries are frequently associated

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with considerable damage to the soft tissues.

Fracture of the lamina with or without fracture of the bodies may occur. Fractures of the sacrum are very rare and are often unrecognized unless a well-detailed x-ray is obtained. Fractures of the coccyx occur more often and may be detected by palpation and manipulation of the coccyx with a finger in the rectum. Here too, the x-ray examination confirms the diagnosis.

All of these conditions are treated by proper immobilization of the injured part for a sufficient period of time followed by proper supportive appliances for the back as indicated. Occasionally fractures of the coccyx are best treated by completely removing the distal fragment. In uncomplicated cases of any of these injuries the prognosis is as a rule good.

Eye Injuries and Shock

DR. H. L. HARLEY, *in American Medicine,* (July, 1933):—Shock in eye injuries is as common as its recognition is uncommon. Shock is usually defined as "a depression of vital powers arising from an injury or profound emotion acting on nerve centers inducing exhaustion or inhibition of the vasomotor mechanism, etc." The exact mechanism of shock, from whatever cause, is not definitely known. One might be bold enough to assume briefly that in a case of eye injury the insult of the trauma travels by way of the third nerve to the hypophthalmic region, and from there the impulse (or inhibition) is communicated to the vagus, the vasomotor and the respiratory centers in the brain stem. This, of course, does not explain the psychic shock met in elderly patients after cataract operations, with which this communication does not attempt to deal.

Whatever shock is, it dethrones the ruler of the involuntary nervous system from its rightful sway over the unity of behavior of vital centers. And the point it is desired to stress here is that some degree of shock accompanies many eye injuries and some eye diseases, notably glaucoma and acute iritis, which are in themselves of the nature of trauma.

Three case histories in which it was noted that nausea and vomiting occurred, were cited. It is readily appreciated that little could have been gained by treating the gastrointestinal tract in any one of these cases, when it was the injury of the eye that caused these difficulties.

The aim in the treatment of all shock is to stop the flow of noxious impressions toward the brain, and then to restore bodily equilibrium. The first step in the treatment of shock from eye injuries is the recognition of the cause, and for this a proper appreciation of the importance of the eye to the human organism is a requisite. Not only the importance of the smooth functioning of the eye as the organ of vision but also its intricate association tie-up with the sympathetic and parasympathetic nervous mechanisms should be better understood.

Although considerable literature has been written on the subject of eye injuries, it is difficult to recall any instance where shock has been mentioned in connection with these injuries. The author believes, therefore, that more attention should be given to shock in cases of eye injuries, and that these instances should be reported.

Industrial Medicine News

Compensation in New York

WORKMEN'S compensation insurance, as practiced in New York has its good points as well as its failings. An attempt is being made to overcome its defects. To work things out so that the greatest good will be done to the injured workman, to the doctor, to the insurance carrier, and to society, as a whole, in restoring the injured workman to his normal place in that society, the Special Committee appointed by Governor Lehman, of which Dr. Thomas A. McGoldrick, Chairman, Committee on Medical Economics, is a member, has made recommendations for changes in the existing law. These recommendations seem to be equable, unprejudiced, and fair to all concerned:

1. The employee shall have a freer choice of physician, under certain limitations.

2. Physicians desiring to do compensation work shall enroll for this purpose by registering with a committee designated by the County Medical Society.

3. "Case lifting" shall be done away with. However, the carrier shall be permitted, by right, to demand the usual inspection of the injured workman during the course of treatment by his chosen physician, and under agreed conditions to transfer a patient.

4. The County Medical Society, or its committee, shall list and certify physicians to the Industrial Commission for this work, based upon the physician's own statements. The physician's own conduct shall determine his maintenance or removal from this list upon due and sufficient grounds. A physician not on this list shall not be entitled to collect payment for his work through the Industrial Commission. The County Society, or its committee, shall likewise be responsible for the inspection of "compensation clinics," and for their proper regulation and maintenance.

5. Medical fees shall be standardized. The pernicious practice of undercutting, rebating, splitting or refunding of medical fees shall be eliminated. The advertising or soliciting of compensation work shall be banned.

6. Disputed bills shall be arbitrated by a duly authorized county arbitration committee.

7. The practice of medicine by insurance carriers shall be constituted illegal. Some insurance carriers have been guilty of practicing medicine by attempting to provide cheaper medical care.

8. The medical care of employees of self-insured corporations shall be regulated.

9. Determination of disability, as before, shall be made by a lay referee who shall avail himself of the opinion of an impartial expert, or a duly constituted medical advisory and appeal board.

10. Obscure or difficult medical questions shall be judged by an advisory and appeal board composed of three physicians from each compensation district of the state, who are to be chosen from nine nominations to be made by the County Medical Societies in each district. This board may act upon request by referee, or by either litigant, and its decision shall be conclusive.

11. At least one physician shall be a member of the Industrial Board.

12. Other changes in compensation procedure shall include: (a) licensing

and regulation of clinics; (b) regulations for treatment of compensation cases in municipal, county and state hospitals; (c) punishment for infringement of any of the rules; (d) regulations attempting to expedite the hearings before referees, and such other matters as seem necessary for the proper working of the compensation act.—*Bulletin of the Medical Society of the County of Kings*, February, 1934.

Report on Occupational Diseases Compensation

AMERICAN Public Health Association Year Book, 1933-1934, just distributed, contains the full text of the report on "Standard Practices for Compensation in Occupational Diseases," submitted, by the Committee on Standard Practices, to the Industrial Hygiene Section of the A. P. H. A. at the 62nd Annual Meeting, Indianapolis, Inc., October 10, 1933. This report was summarized on pp. 236 and 237 of *Industrial Medicine* for October, 1933.

Records

DR. MAUD SLYE, University of Chicago Pathologist, proposes that complete permanent medical records be kept for every family as an aid in combating disease. The chief purpose, as Dr. Slye sees it, would be to wipe out, through eugenic mating, those diseases to which men inherit tendencies. Experiments with upward of 100,000 mice have convinced her that tendencies to heart disease, cancer and Brights' disease are hereditary, and that these tendencies can be eliminated from a family.

Dr. Ludwig Hektoen, McCormick Institute for Infectious Diseases, asserted that such records are already being kept by an affiliate of the Carnegie Foundation at Long Island, N. Y. He said: "The sooner we start such records the better. In some Scandinavian parishes, records containing valuable medical information go back a century or more and are frequently consulted to advantage by physicians."

Dr. H. N. Bundesen, President, Chicago Board of Health, believes in keeping full records. His view: "They should be kept in the possession of each family. Medical histories contain many secrets which should not be made available to any one outside the family except the physician."

National Income

NATIONAL Industrial Conference Board's preliminary estimate of the national income produced in the United States in 1933 is $39.8 billion. This represents an increase of $1.5 billion, or 3.7%, over the total of $38.3 billion for 1932. Income per capita of the total population was $316 in 1933, as compared with $307 in 1932. In the years 1930 to 1932, the national income declined continuously, from $83 billion in 1929, to $70.5 billion in 1930, to $54.7 billion in 1931, and to $38.3 billion in 1932.

Year	Total, billion dollars	Per Capita	Per Gainful Worker, Including Unemployed	Index of Wholesale Prices, All Commodities, Base, 1926 = 100
1909	27.2	$300	$ 716	67.6
1910	30.1	326	785	70.4
1911	29.4	314	761	64.9
1912	31.8	334	814	69.1
1913	33.7	350	857	69.8
1914	32.0	327	806	68.1
1915	34.5	347	860	69.5
1916	44.2	439	1,093	85.5
1917	53.2	521	1,304	117.5
1918	60.2	581	1,463	131.3
1919	67.4	642	1,623	138.6
1920	74.3	697	1,770	154.4
1921	52.6	486	1,233	97.6
1922	61.7	562	1,423	96.7
1923	69.8	626	1,584	100.6
1924	69.6	615	1,555	98.1
1925	77.1	671	1,695	103.5
1926	78.5	674	1,699	100.0
1927	77.2	653	1,647	95.4
1928	90.5	671	1,691	96.7
1929	83.0	683	1,719	95.3
1930	70.5	572	1,439	86.4
1931	54.7	440	1,108	73.0
1932	38.3*	307*	772*	64.8
1933	39.8*	316*	795*	65.9

*Preliminary estimate.

Estimates of National Income Produced, 1909-1933

Employee Activities

AMERICAN Sugar Refining Company's combined employee activities for 1933 show an expenditure of $305,414.80—bringing the total thus spent up to $4,270,262.50.

First aid and subsequent treatment have been continued at the several refineries and plants, as heretofore.

Sick and injury benefits during the year cost $12,325.64, making a total of $459,876.48 paid since the beginning of 1914. Free medical attention (in addition to that required under workmen's compensation laws) is offered to all employees who wish to be treated at the company's dispensaries.

At the end of the year there were 475 pensioners, a net decrease of 20 during the year. Payments of $267,089.16 under the pension plan were made during the year. Total payments since its adoption in 1912 amount to $3,418,286.02.

Among employees covered by group insurance there were 26 deaths, and under their policies $26,000 was paid the beneficiaries. From 1919 to 1933, both inclusive, there have been 429 deaths and five permanent disability claims, and payments of $392,100.—*Annual Report* for 1933.

Compensation in Pennsylvania

INTEREST in improving the situation of the worker injured on the job assumed concrete form in Pennsylvania with the appointment of a commission in 1913. The legislature enacted the workmen's compensation act in 1915 to be effective January 1, 1916. Nominally an elective law, the act has in effect been compulsory on all employers with the usual exceptions of farm labor, domestic workers, and casual workers not engaged in the regular course of the employer's business. Insurance for compensation payments is required in the state Workmen's Insurance Fund or in any authorized stock or mutual company, excepting firms with adequate financial ability which may be self-insurers. The act created the Bureau of Workmen's Compensation in the department to be the administrative agency. Referees were provided to pass on disputed cases, and a Workmen's Compensation Board established to serve as a court of appeal.

The work of the Bureau of Workmen's Compensation, the referees, and the Workmen's Compensation Board during the 18 years of existence, has fluctuated almost directly with the number of accidents reported each month. There has been a distinct lag, however, between the peaks of industrial activity and the periods of heaviest work of the referees and the Board. Indemnity of $216,000,000 has been recovered for injured workers during the existence of the workmen's compensation system in Pennsylvania.

The procedure whereby employer

and injured worker, under the supervision of the Bureau, make agreement for the amount of compensation to be paid has eliminated largely the use of lawyers and court action. Over 90% of all compensated accidents have been indemnified by this agreement procedure. When disagreements arise over the application of compensation rights in particular cases, referees hear both sides. During the entire period from 1916 through 1933 the referees have been called on to consider 95,674 petitions, about one-half of which resulted in awards to the worker.

The workmen's compensation law has been amended frequently. Most of the amendments have been on matters of procedure. A few have had the effect of increasing the benefits paid to injured workers, notably those of 1919 and 1927 which reduced the waiting period and increased the weekly payments.

Benefits were reduced substantially in an indirect though very effective manner by the Superior Court's decision of 1933 in the Romig case. This decision rules out, from a large percentage of cases, the five and one-half day week as the basis for determining normal wages upon which an injured person's compensation is based. A Supreme Court decision is expected on this case in 1934.

Teeth were put in the compulsory insurance feature of the law in 1929. This amendment providing for fine and imprisonment of violators has been used very effectively in statewide campaigns for compliance in 1933. It has minimized the number of claimants against uninsured employers in a year when there was every temptation for the operation of business on a shoe-string basis.—*Monthly Bulletin,* Department of Labor and Industry, Pennsylvania, December, 1933.

Railroad Working Conditions

THE ACT creating the office of the Federal Coordinator of Transportation seems to have laid upon the Coordinator the duty of reporting to Congress recommendations regarding a permanent labor policy. The Coordinator created a Labor Relations Section and appointed a Committee composed mostly of college professors to act in an advisory capacity to the Director of the Labor Relations Section, who is Otto S. Beyer. As an addition to the Advisory Committee, the Labor Relations Section, upon the recommendation of that Committee, engaged several experts to investigate and report upon special phases of labor problems: Bryce Stewart, of Industrial Relations Counselors, will report on employment offices, and unemployment insurance; Everett D. Hawkins, of Princeton, upon dismissal compensation; and Carter Goodrich, of Columbia, upon hours. The Coordinator received a grant from the CWA to defray expenses of collecting personnel records from a number of railroads and to pay for the tabulation and analysis of these records. They are securing from 14 railroads, well distributed over the country, complete personnel histories of perhaps 400,000 railroad employees, giving ages, dates of original entry into service, occupation changes, periods of absence with reasons therefor, periods of service on other railroads, rates of pay in 1933, and actual annual earnings for the period 1924-1933. They are also collecting records of pensioners covering all railroad employees retired under formal pension plans in this country. They hope from these data to be able to make reasonably accurate valuations of any proposed pension

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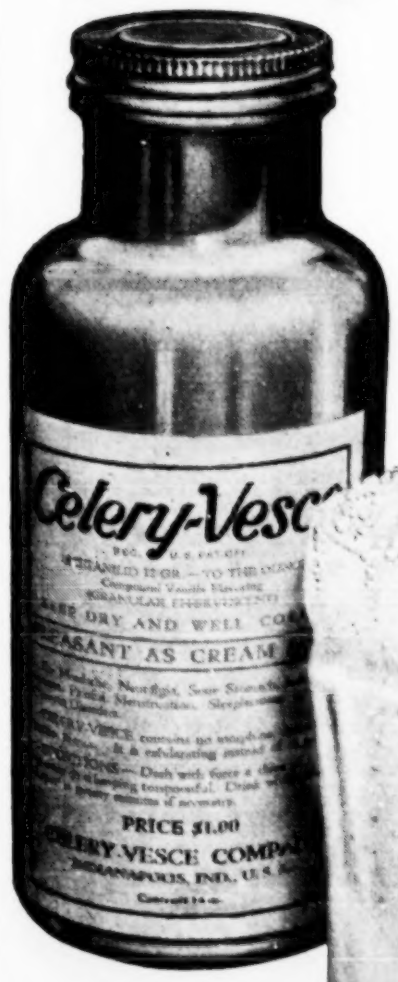

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scheme, and an estimate as to what expenditures might have been in the last 10 years had a scheme of unemployment benefits and dismissal compensation been in effect. The collection of the data is proceeding rapidly. They have had about 1300 people copying records from the railroad files, and are now engaged in setting up a computing and tabulating unit of over 500 people in New York. The data will be assembled in tabulated form within a reasonable time. It is believed that the results of this work will be available to any one concerned and will, of course, throw much light upon the current industrial situation as to the railroads.

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ARMOUR AND COMPANY, Chicago, manufacture a large group of endocrine and other organotherapeutic preparations. Among these are the corpus luteum, mammary, and orchic substances: bile salts, various liver preparations; pituitary and ovarian substances; thyroid, parathyroid, bone marrow, spleen, thymus, and suprarenalin compounds. Various kinds of digestive substances, from the pancreas, pepsin, and enzymes are also marketed. The newest product is what is known as gastric mucin.

DeVILBISS COMPANY, Toledo, Ohio, manufacturers of medicinal atomizers, announce the new DeVILBISS NASAL GUARD, now furnished on all DeVilbiss Atomizers, eliminating any possibility of undersirable results in the hands of the layman. The new nasal guard has four air venting grooves, avoiding excess pressure in the nasal passages during self-treatment. This company also makes DeVILBISS PRO-TEK, "the protective skin film," a white cream which prevents stubborn liquids or dirts from adhering. When it is properly used, no dirt can touch the skin. It is not a soap, is soluble in water only and is widely used wherever men work with their hands, furnishing a protective film which insures the quick removal of, and protects against, lacquer, paint, varnish, thinner, grease, oil, printing ink, acids and acid fumes, cutting compounds, naphtha, gasoline, cleaning fluids, dirt, coal and metallic dusts and similar substances. It is already familiar in the painting industry, in finishing operations, in industrial plants, in garages and service stations, in battery shops and in printing and engraving plants; railroad men, pipe fitters, millwrights, miners and coal handlers use it; for protection against gasoline, naphtha, etc., dry cleaning plants also use it. Physicians and nurses in charge of dispensaries at industrial plants find it preventive of oil dermatitis.

WILSON RUBBER COMPANY, Canton, Ohio, encloses a folder on one of its products, WILTEX SURGEON GLOVES, which it believes will be of interest to doctors in industry. They say this "because this glove lasts from three to five times as long as the ordinary pure gum surgeons glove without deterioration; gives from five to 10 times as many sterilizations, and has approximately twice the tensile strength, resisting tearing and snagging to a much greater degree than the old type of gloves. This is especially important to industrial physicians and surgeons who, perhaps, do not always have the facilities to protect their gloves as well as the ordinary hospitals. Here is possibly the most rugged glove known to the profession today."

PATTERSON SCREEN COMPANY, Towanda, Penna., is marketing two products which should be of interest to physicians: a new fluoroscopic screen called Patterson Type B and two intensifying screens called Hi-Speed Combination and Par-Speed Combination.

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"RATHER HEAVY," might characterize this issue of *Industrial Medicine* • • • There is considerable on silicosis. DR. CHAMBERLAIN'S radio talk (p. 147) was named by him, "An Ancient Disease in Modern Industry." DR. SAPPINGTON'S "Order from Chaos" (p. 168) covers the use of scientific methods in the prevention, control and defense of cases involving this disease. Miners' asthma, silicosis in lead and zinc miners, and the effects of cement dust, in "Here and There in the Law and the Literature" (p. 159) have a bearing on it. FRIEDA S. MILLER'S "Occupational Disease Claims," in the Digest (p. 182) speaks, in this connection, of "one of the most cruel and startling gaps in the occupational disease law." Articles by DR. SAYERS, on "Clinical Silicosis" (p. 184): DR. LANZA, on "Etiology of Silicosis" (p. 184); DR. MCNALLY, on "Silicon Dioxide Content of Lungs" (p. 185); DR. GARDNER, on "Pathologic Reaction in Pneumonoconiosis" (p. 186); and DRS. PANCOAST and PENDERGRASS on "Roentgenology of Pneumonoconiosis" (p. 186) are summarized; and the Recommendations of the SPECIAL INDUSTRIAL DISEASE COMMISSION OF MASSACHUSETTS (p. 186) were adopted after a study of 314 granite establishments and 225 foundries • • • DR. CHAMBERLAIN'S radio talk on silicosis (p. 147) contains a real "significance": "* * * not a single silicosis claim has been successfully defended in the City of Chicago, and only one has been successfully defended in the State of Illinois." According to one authority, the silicosis claims now pending in the courts of this country aggregate $300,000,000 in amounts sued for • • • ANDREW J. FARRELL, whose article "Silicosis in Certain of Its Legal Aspects," appeared in *Industrial Medicine* for October, 1932, is preparing another, written from the point of view of counsel for the defense, which will be a feature of an issue in the near future. He wants to call it "The Silicosis Racket." Whether it is published under that title or another, its subject matter is just that • • • DR. HART FISHER'S Medical Department Manual covers four sections: "Functions and Routines" (p. 150), "The Centralized Medical Department" (p. 153), "Subjective and Objective Relations" (p. 155) and "Research in Industrial Medicine and Surgery" (p. 157). Next month's instalment, as noted editorially (p. 177), will be 'Medical Department Forms" • • • WHO'S WHO IN I. M. & S. is conspicuous by its absence this month. The author's reason for not releasing one of the several sketches now being prepared recalls Barrie's "Sentimental Tommy," who refused to finish his essay for the Hugh Blackadder prize because "I wanted *one* word" • • • DR. ROBERT T. LEGGE reaches Chapt. III of his very interesting history of industrial medicine (p. 143), ending the instalment with America becoming the greatest industrial country of the world." So "industrial," indeed, that its industrialism is blamed for the somewhat drastic experiments of the period of transition it is now going through. But time will disclose that there were other, and equally important, contributing causes Perspective of the past reveals, for example, that drastic experiments in government flourish when the normal rate of increase of population begins to fall off • • • DR. LAZENBY'S article on "Occupational Diseases" (p. 137) contains this forceful sentence: "There is no more vital problem confronting the industrial employer today than the conservation of the health of his working force" Another sentence, of like forcefulness, is this one: "We cannot compensate vigorous health into the leaded, nor good lungs into the silicotic"; which he follows up with: "Our pressing problem is the prevention of the disease." In fact, this whole article is one powerful sentence after another. It will repay a thorough and thoughtful reading • • • DR. LOWE (p. 149) describes an interesting use of sponge rubber• • • HERE AND THERE IN THE LAW AND THE LITERATURE (p. 159) gathers up several items of timely importance • • • DR. HULBERT'S "Worriers" (p. 171) speaks for itself. We refuse to worry about its reactions on our readers • • • PROBLEM VII (p. 174) treats of Carbon Monoxide Poisoning • • • DR. MAUD SLYE'S proposal (p. 201) that "complete, permanent medical records be kept for every family," widely mentioned in the newspapers, emphasizes the importance of records. But nowhere are they more important than in industrial medicine. And, in the opinion of some authorities, they are not *complete* there until they have included an "exit medical examination" • • • THE LEWIS bill, providing for "unemployment insurance," applies to all employers of 10 or more persons, and to all employees except farm laborers, domestic servants, teachers, *physicians*, railroad employees, and a few minor classes. Thus the matter of "unemployment insurance" has a very definite Federal aspect—urged thereto by Secretary of Labor Frances Perkins. Although physicians are exempted from the effect of this bill, as well as most other like bills proposed in state legislatures, the industrial physician is scheduled for a very necessary connection with "unemployment insurance" whatever its form. For example, legislation along this line finds it uniformly advisable to include an equivalent of the Wisconsin provision that "no employee shall be deemed eligible for benefits on account of either partial or total unemployment during any calendar week unless such employee was physically able to work and available for work whenever with due notice called on by his employer to report for work." But deeper than that is the *fact* of the employment. Obviously enough if the employer is to have imposed upon him, by law, after the employment ceases, an expense which is the equivalent of extra wages to an ex-employee, then he will, in self defense, be compelled to the limit of precaution about who shall become entitled to the wages in the first instance. If every employee is to continue to be paid *after* he ceases to be an employee, then the employer is going to be much more careful about the applicant *before* he begins to be an employee. *Selection*—at source, as it were—must, therefore, be the rule. (See Dr. Gehrmann's article on p. 193.) And who can do this selecting except the *company* physician? Who else can know the circumstances for which the selection is to be made? The background of any proper answers to these questions shows that there isn't, because there can't be, in this respect at least, any such "unfair competition" as DR. SPEER uses strong words about (p. 173). DR. SPEER, rather "views with alarm." Maybe he overlooks the fact that group practice and group association are the order of the day. No physician in such contacts needs to sacrifice any element of the inviolability of the patient-and-doctor relationship; numerous industrial doctors, in good standing, are prepared to verify this from their own experience.

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